Chemical Week

July 14, 1956

Price 35 cents

All signs point to a coal-sparked electrochemical boom in the Ohio River Valley . . . . . p. 25

U.S. industrial security: a working system with checks against loss of human rights . . . . . p. 28

Know why Rare Earths Inc. chose the sulfuric process for its big new Curtis Bay, Md., plant? . . . p. 68

Chemical firms take to the road: showrooms on wheels put products in users' hands . . . . . p. 76

Specialties makers are optimistic in returns of latest CW nationwide survey . . . . . p. 88

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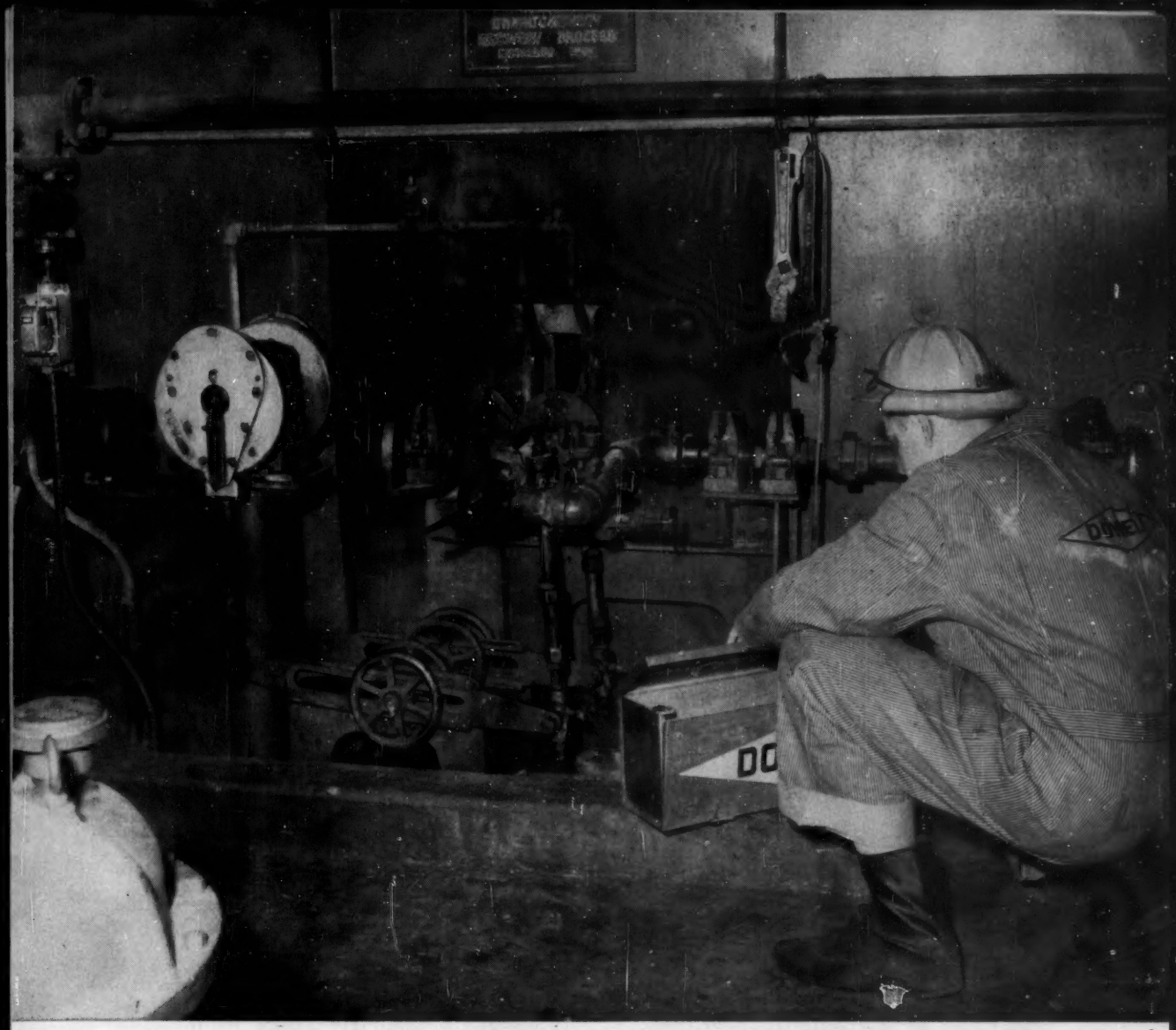

The risk is too great —clean it right

You don't take risks when men, equipment, and lost production time are involved. That's why more and more companies are investigating the methods and firms used in their chemical cleaning. They know it's work for experts.

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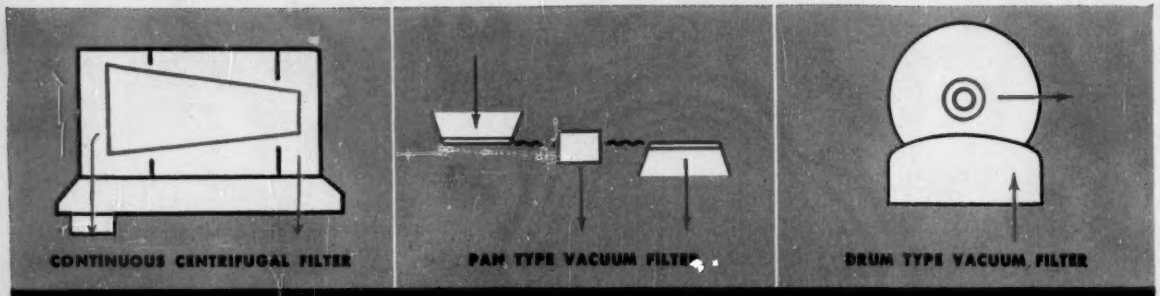
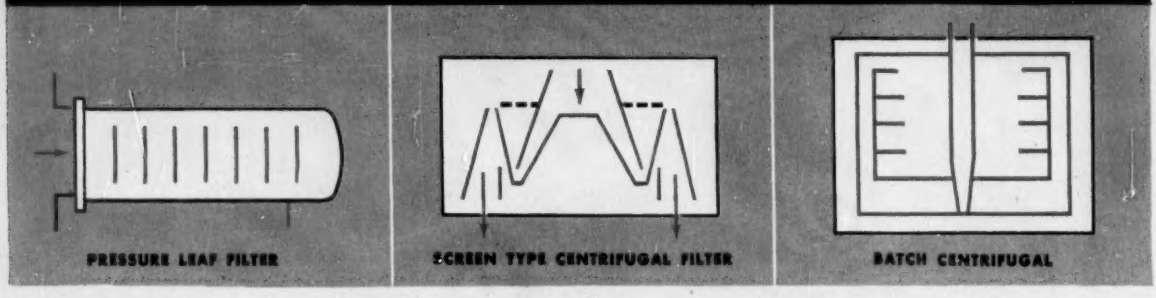


When the flow sheet says FILTER



Here's how you can be sure you get the one best filter for the job

Before you sketch *any* of these filter symbols into your flow sheet, get suggestions or recommendations from the leading authority on solids-liquids separations — BIRD.

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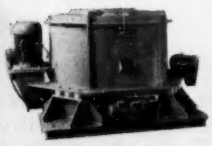
Bird Humboldt Screen Centrifugal Dryer

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Chemical Week

TOP OF THE WEEK July 14, 1956

Congress is now probing Syntex and its alleged cartel in barbasco roots, raw material for steroid hormones. Here are the facts .....p. 20

AFL-CIO's Oil, Chemical and Atomic Workers lose twice in New York to United Mine Workers .....p. 34

Natural rubber producers step up research pace. Object: to win both new and old markets from synthetics p. 48

Britain's recession hits the plastics industry, but the setback should be temporary .....p. 85

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Rare Earth's new plant revamps oldest process for cracking monazite sands

72 Process heat or cooling served up on new hollow-tube tray

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Future trend? More chemical companies are using traveling exhibits

78 Accident triggers demand for more manholes on tank cars

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86 New soil fumigant goes commercial, aims for share of markets now held by methyl bromide

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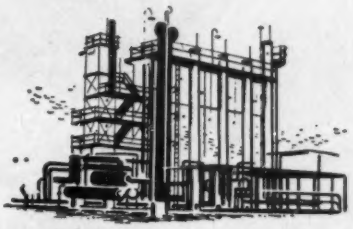
Plant expansions, booming sales mark enthusiastic specialties makers attitude, latest *CW* survey shows

100 British consider regulating synthetic detergent sales

PROBLEM

To produce hydrogen essentially free of carbon monoxide which has a deleterious effect on product quality and plant capacity for edible oil producers.



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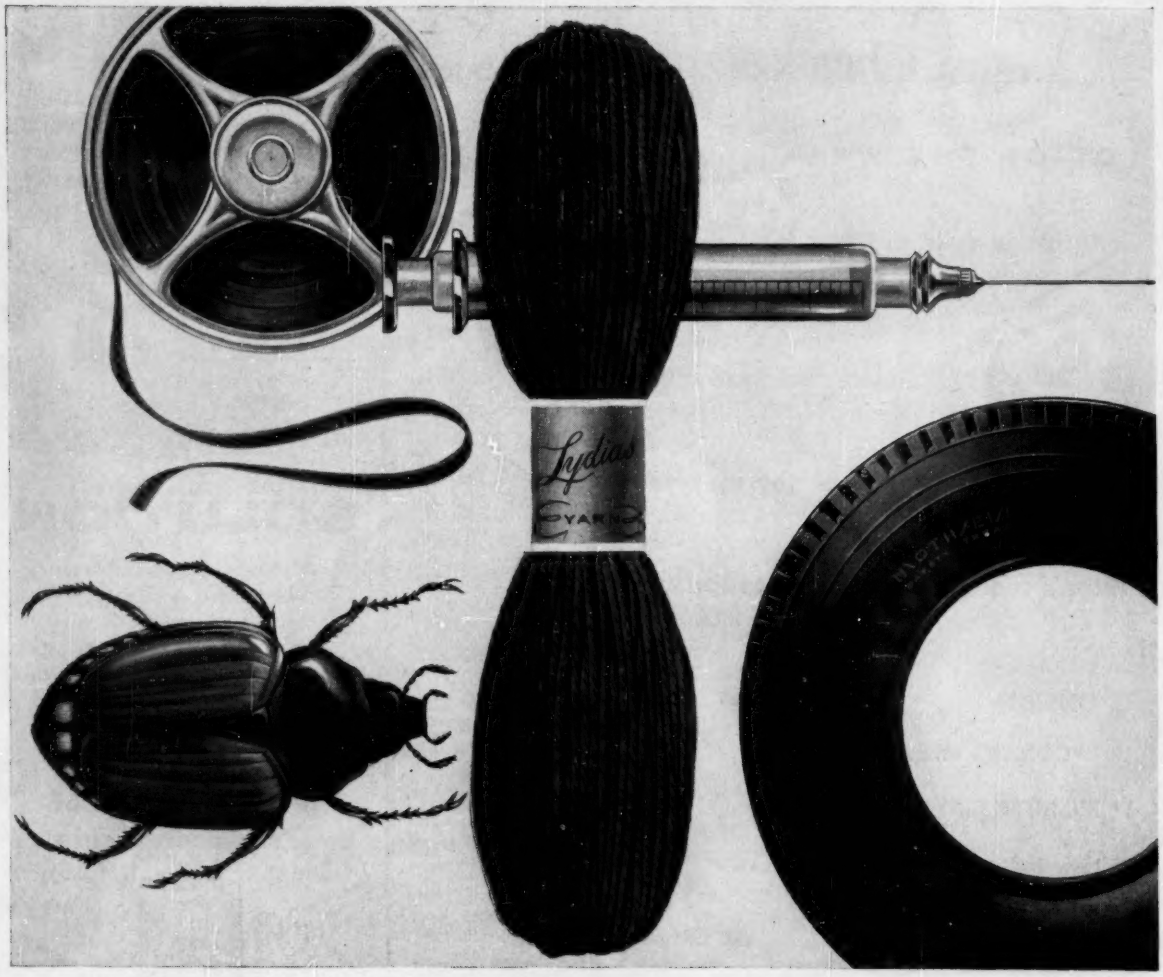

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July 14, 1956 *Vol. 79, No. 2*

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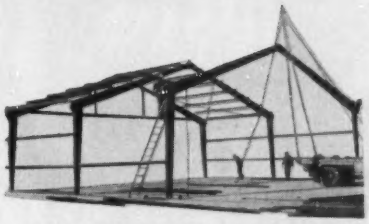

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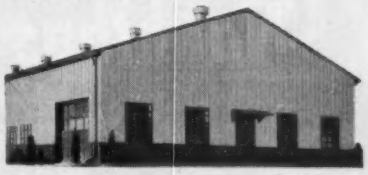
While your foundation is curing, pre-engineered and factory formed and punched Butler parts are delivered to your site. In days, the sturdy rigid frame is up and die-formed cover panels are going on.



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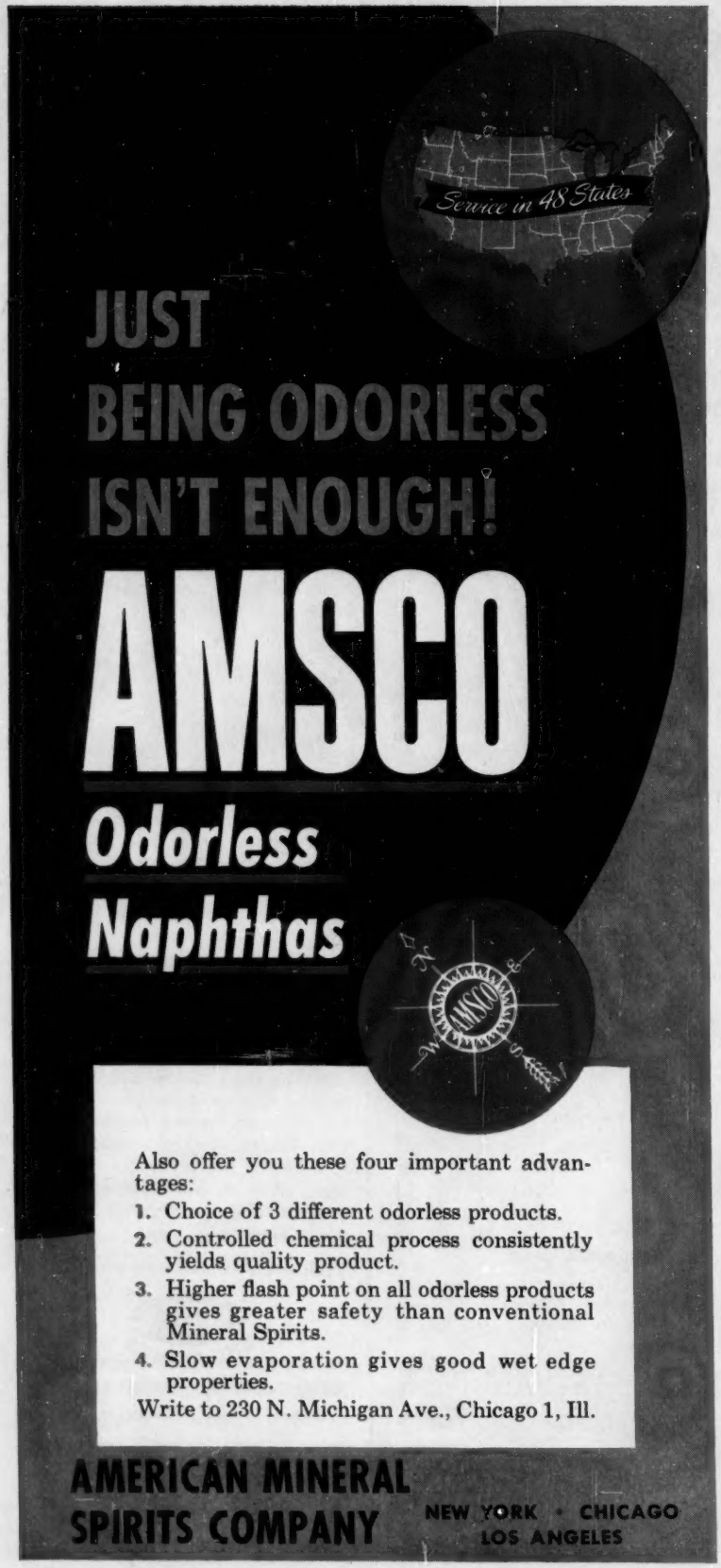
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OPINION

Cyanoethylation Far Along

TO THE EDITOR: We were interested to see the timely and quite comprehensive report on cyanoethylation products, "New Angles for Acrylonitrile" (*CW, June 23*). By way of comment, you may be interested to know that the commercial development of chemicals derived by cyanoethylation processes is somewhat further advanced than the article would seem to indicate.

Cyanamid, for example, based on more than 15 years of pioneering research and development in this field, currently offers some 35 such derivatives of acrylonitrile. These interesting products, including amines, acids, esters and other nitriles, are finding a wide variety of application in industry.

A number of these chemicals are now produced in our semiworks, and are available in truckload quantities.

B. R. PUTNAM, JR.
Manager of Market Development
American Cyanamid Co.
New York

Tough, Clean Competition

TO THE EDITOR: . . . I think the Supreme Court decision (the Du Pont cellophane trust case) a just one, because, while we have always found Du Pont to be tough, clean competition, we also find that it has no monopoly on quality, sales and service.

HARRY L. DALTON
Vice-Chairman
American Viscose Corp.
Philadelphia

Likes Layouts

TO THE EDITOR: Knowing that criticisms—good and bad—are always welcomed by editors, I decided to write a long-neglected letter. After perusing the latest issue (*June 16*), I

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

am firmly convinced that the general layout and makeup of the magazine is indeed superb. The picture story on MCA's annual meeting at White Sulphur was a clever way of telling a story, and I hope that you will continue to do more of this in the future.

JOSEPH FERTAG
Wichita, Kan.

CW at the MCA

TO THE EDITOR: I would like to take this opportunity to compliment you on the excellent coverage given the recent MCA meeting at The Greenbrier. As chairman of the program committee, I am particularly mindful of the good reporting and pictures taken of the occasion.

HANS STAUFFER
President
Stauffer Chemical Co.
New York

Jobbers' Role in Chemicals

TO THE EDITOR: The article "Looking Ahead Worries Slow Jobber Growth" (*May 19*) . . . contains some very interesting information and indicates that real progress is being made in the right direction. I want to compliment you on the fact that CHEMICAL WEEK is sufficiently interested in this subject to make a survey. . . .

S. B. SCOTT
Director of Sales
Wyandotte Chemicals Corp.
Wyandotte, Mich.

Steel Strike Raises Questions

TO THE EDITOR: Your first story in the July 7 issue, and the Business Newsletter too, reported excellently on the steel strike; but like so many other news sources, you failed to take into account the effect of a strike—whether it's long or short—on the largest and most neglected segment of our population, the general public.

The way I see it, steel management is in the middle, and stands to gain or lose very little, regardless of the outcome of the negotiations. The labor monopoly (for that is what the steel union is), by virtue of its unchallenged strength, can ultimately dictate the terms of settlement. Management must accept those terms if it wants to

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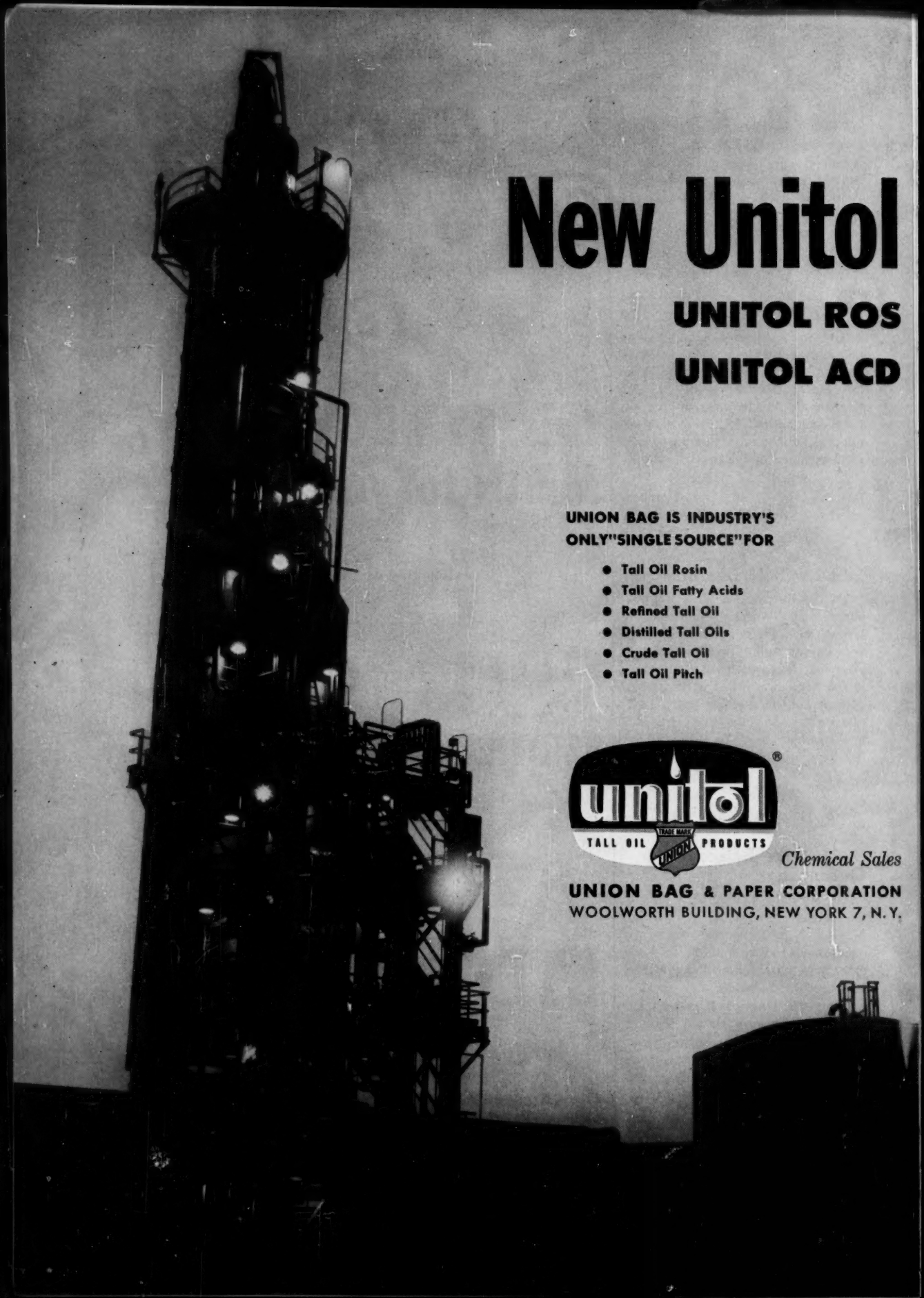

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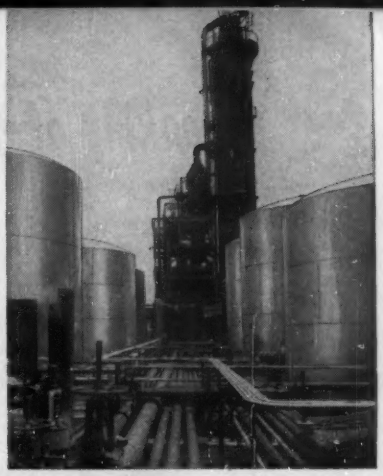

ALUMINUM STORAGE TANKS are used to produce and maintain product with outstanding color characteristics. Miles of aluminum and stainless steel piping serve the operation and inventory.

The most modern tall oil distillation plant in the world is now in operation in Savannah, Georgia.

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Demand for *Unitol* products is at an all-time high. The pine wood derivatives obtained in the Kraft paper manufacturing process are being used increasingly in protective coatings, soaps and cleaners, linoleum, textiles, adhesives, disinfectants, fungicides, emulsions, paper sizes and water-proofing agents.

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Unitol ROS (tall oil rosin) and *Unitol ACD* (tall oil fatty acid) guarantee the user an outstanding competitive position. In color, odor, uniformity, and all other characteristics, *Unitol* products are outstanding examples of the high standard of development of the American chemical industry.

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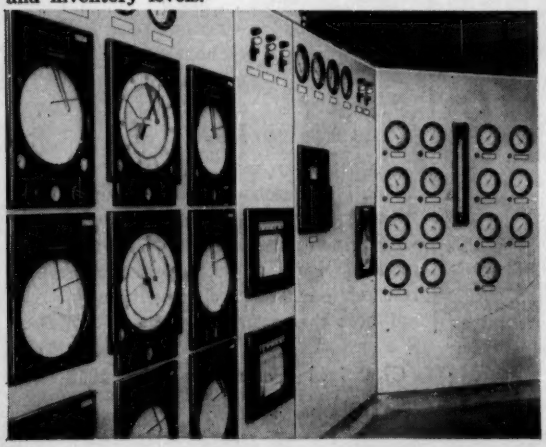

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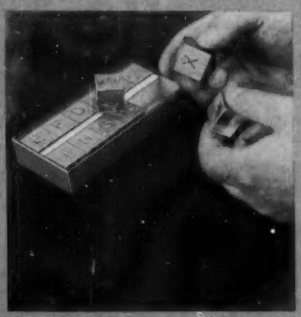
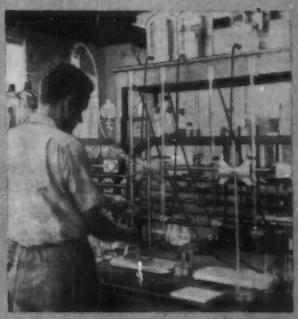


PALEST ROSIN YET. Technician compares rosin control cube with color standards.



HIGH FATTY ACID PURITY requires constant check, such as acid titration.

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stay in business, but it doesn't have to bear the cost—that's passed on to the consuming public.

I've forgotten how many "rounds" of steel wage increases we've had since World War II, but I'm sure there have been half a dozen at least, and each one has been inflationary in that it was greater in proportion than the interim increase in productivity.

What the chemical industry should be worrying about is not the supplies of coal-tar chemicals, nor the temporary loss of their steel-industry markets, but the effect of the steel wage settlement on their own labor pattern. Inflationary wage increases at home drive a wedge for foreign imports, and render less tenable those markets that chemical products have wrested away from competitive materials.

What is the solution? The only one I see is a return to a free, unmonopolized labor market wherein no group —be it management or labor—is big enough and powerful enough to cripple a whole economy.

How to accomplish this return is another question. The steel companies, it seems to me, are operating in violation of our antitrust laws by bargaining in collusion; but that is the only logical answer to the industry-wide scope of the steel union. Perhaps mandatory plant-by-plant bargaining is the answer—which, in effect, is the application of antitrust laws to labor as well as to capital. Perhaps an extension of the profit-sharing principle or the encouragement of stock ownership by the workers is the answer—whereby labor would feel a direct responsibility for the welfare of an enterprise. Perhaps there are better answers. In any case, one has to be found in order that 160,000,000 Americans should not become pawns in the economic struggle between a few powerful men—that, almost by definition, is tyranny. . . . Since I am [an] industrial relations director, I ask that you not publish my name.

NAME WITHHELD

Cans Times 1,000

TO THE EDITOR: . . . I think the article ["Research—Base for a Future Aerosol Boom" (*June 16*)] was very well written and certainly gives a true picture regarding the importance of research in our relatively new industry.

I note that your copy states "Can

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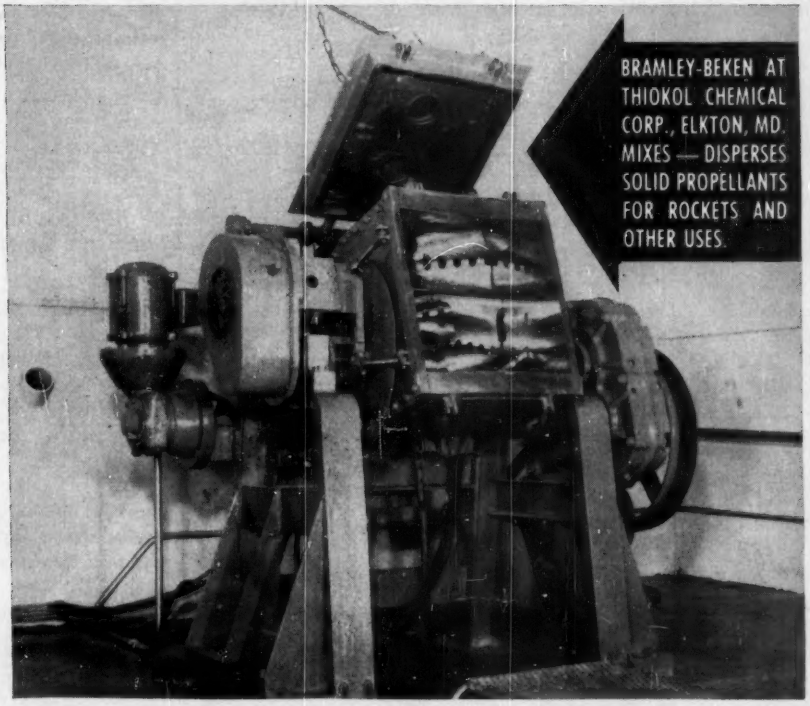
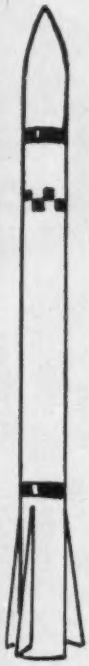




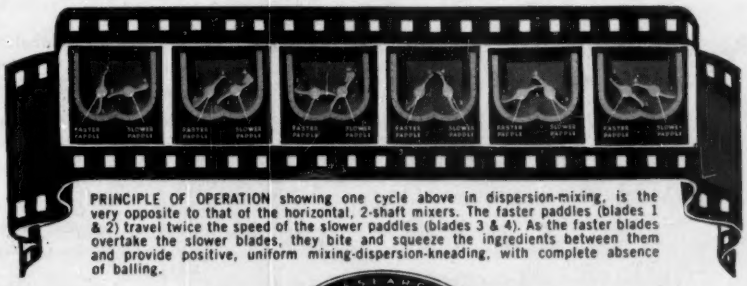
Because... VERY EFFICIENT *for* MIXING SOLID PROPELLANTS *for* ROCKETS *and* OTHER USES *Where* DEPENDABILITY IS A *Must!*

HEAT TRANSFER IS DIRECT AND POSITIVE. Paddles draw material away from the trough walls instead of building up heat by pushing or smearing against the walls.

ALL POWER GOES INTO PRODUCTIVE WORK. Only that part of the mass being squeezed between the multiple paddle blades is worked on **at any one time.** Hence, saving in power . . . increased productivity . . . less operating and maintenance costs . . . faster output . . . and a better end-product.

Laboratory and pilot test facilities are available.

The selection of the Bramley-Beken by America's top leaders in the chemical and processing industries is significant and indicative.



PRINCIPLE OF OPERATION showing one cycle above in dispersion-mixing, is the very opposite to that of the horizontal, 2-shaft mixers. The faster paddles (blades 1 & 2) travel twice the speed of the slower paddles (blades 3 & 4). As the faster blades overtake the slower blades, they bite and squeeze the ingredients between them and provide positive, uniform mixing-dispersion-kneading, with complete absence of balling.

RESEARCH MECHANICAL **Bramley Machinery Corporation** ENGINEERS DEVELOPMENT

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MONOSODIUM PHOSPHATE
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Write for informative and descriptive folder

A. R. MAAS CHEMICAL CO.
Division of Victor Chemical Works
4570 Ardine Street • South Gate, Calif.

OPINION

manufacturers are, of course, interested in the aerosol industry, which consumes 250,000 to 300,000 cans each year." I am sure this is a misprint and the figure should be 250,000,000 to 300,000,000 cans per year.

R. W. SVENDSEN
Chase Products Co.
Maywood, Ill.

Right you are, Reader Svendsen.—ED.

Aniline Looms Larger

TO THE EDITOR: . . . I compliment you on your recent article on aniline (*June 23*). We of the Chemical Division of United States Rubber Co. believe your study of the future of aniline is very good in that it serves as a check on our thinking and future planning. . . .

We are of the firm belief that the the new developments for the use of aniline over the next five to ten years will make for an even stronger growth.

C. H. MADSEN
Production Manager,
Chemicals and Explosives
Naugatuck Chemical Division
New York

SEE YOU THERE

Symposium on Synthetic Polymer Chemistry, Notre Dame, Ind., July 16-17.

Virginia Polytechnic Institute, 9th Oak Ridge Regional Symposium, Blacksburg, Va., July 30-31.

National Soybean Processors Assn. and American Soybean Assn., annual meeting, University of Illinois, Urbana, Aug. 13-15.

American Institute of Chemical Engineers, meeting, William Penn Hotel, Pittsburgh, Sept. 9-12.

International Congress on Catalysis, meeting, Bellevue-Stratford Hotel, Philadelphia, Sept. 10-14.

Drug, Chemical and Allied Trades Section of the New York Board of Trade, annual meeting, Pocono Manor, Pa., Sept. 27-30.

National Electronics Conference, Hotel Sherman, Chicago, Oct. 1-3.

American Mining Congress Metal Mining-Industrial Minerals, convention and exposition, Shrine Exposition Hall, Los Angeles, Oct. 1-4.

American Institute of Electrical Engineers, fall general meeting, Morrison Hotel, Chicago, Oct. 1-5.

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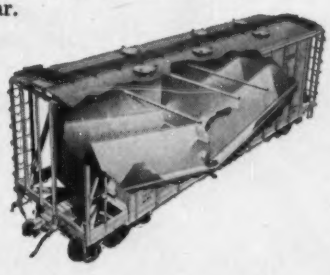
Save! Ship chemicals in bulk via Airslide® cars

Airslide cars provide *safe, clean, economical* bulk transportation for dry, powdered chemicals. 35 tons of lighter materials (and even greater quantities of denser materials) can be shipped in a single Airslide car. Over 2000 Airslide cars are now in use or on order carrying chemicals and other commodities. They require no re-spotting, provide far more clearance for unloading and can be unloaded into any conveying system as fast as the system permits. If such requirements are important to you, write today for full information about General American's new Airslide car.

CLEAN INTERIOR DESIGN. *All-welded construction provides maximum sanitation and minimum product retention. All hatches and outlets provide a hermetic seal, assuring complete in-transit protection.*



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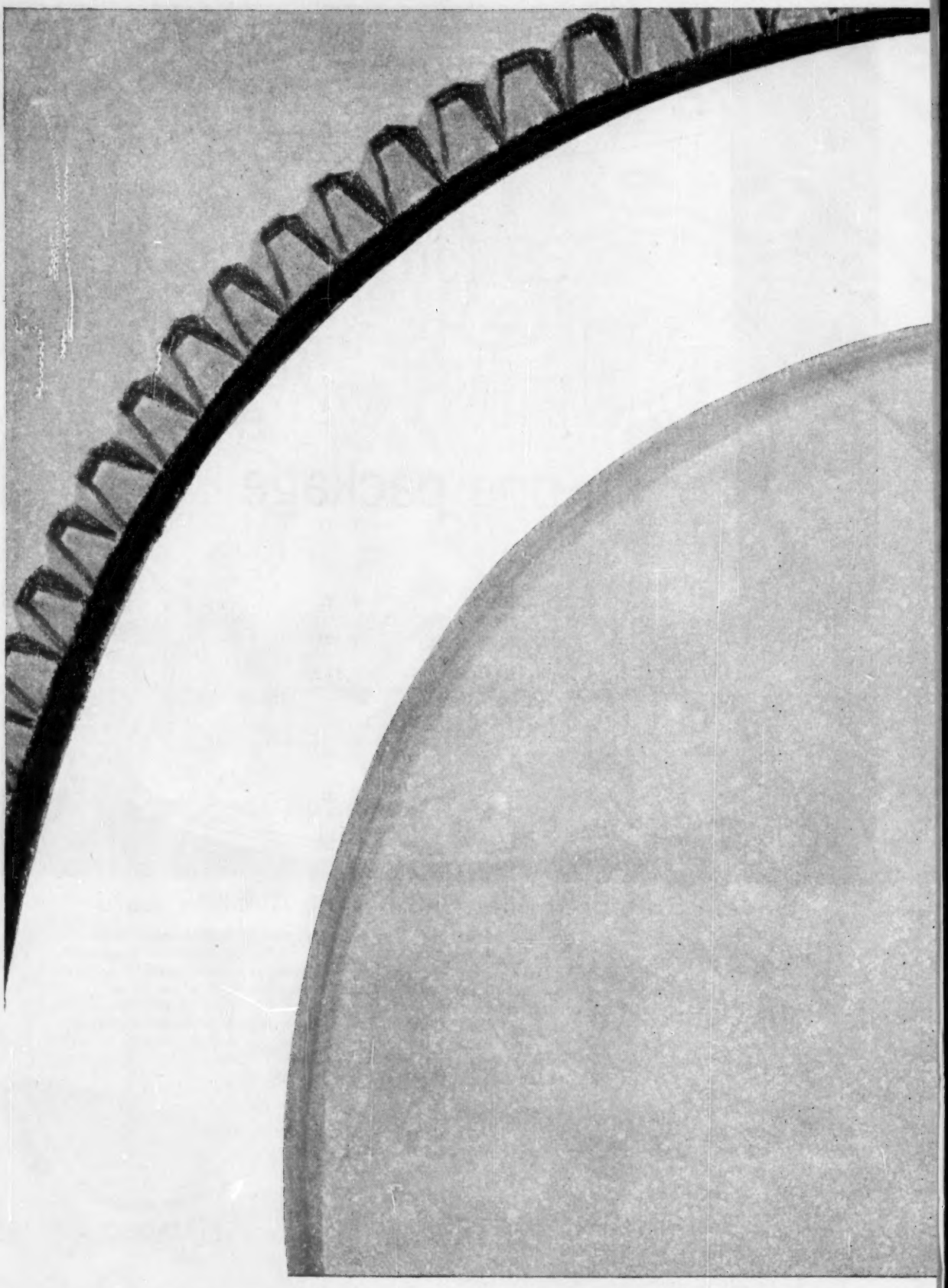

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are unmatched . . . unduplicated . . .
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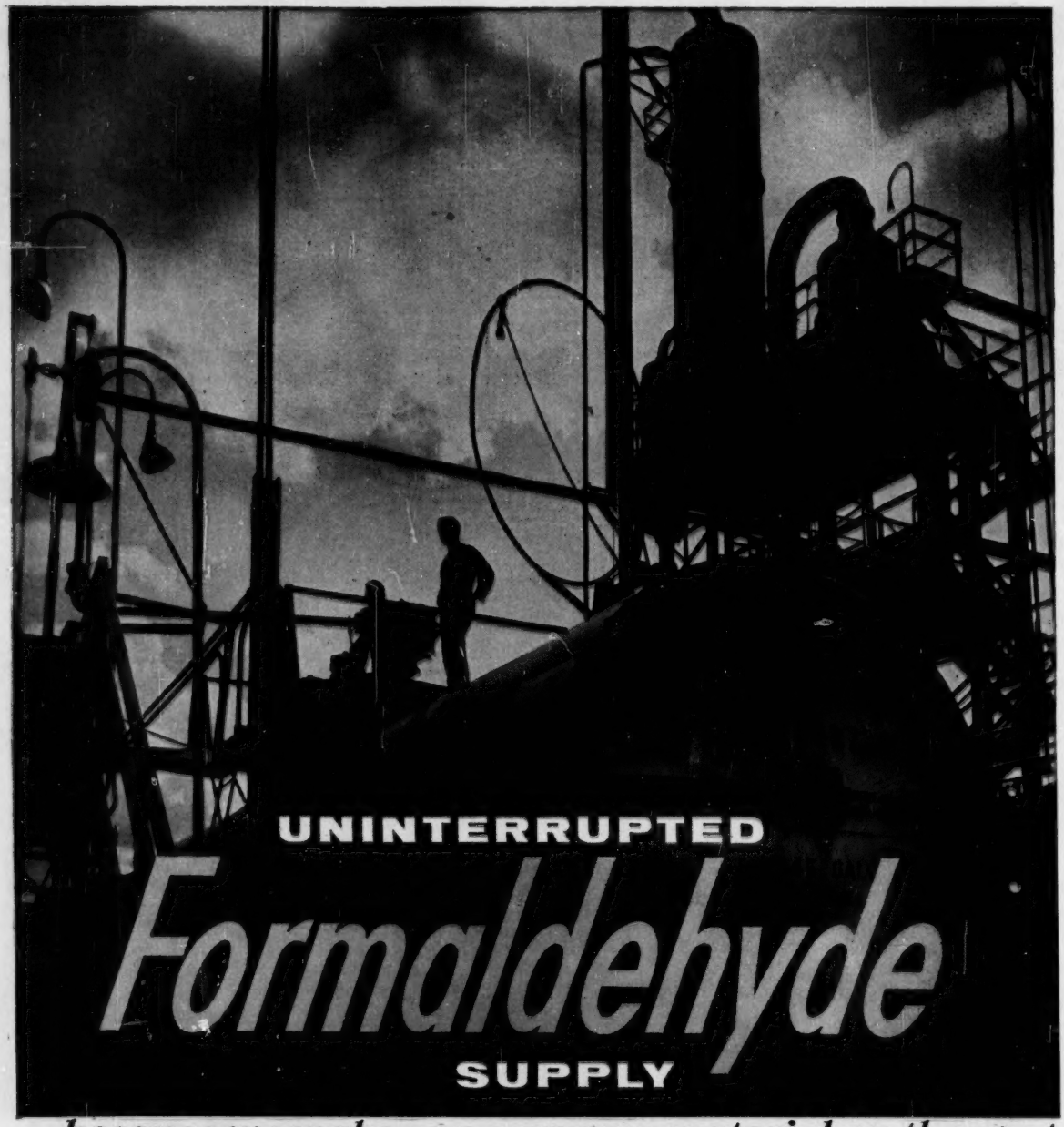

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Business
Newsletter

CHEMICAL WEEK
July 14, 1956

Here's the outlook for the second half of '56 in the industries that bulk large as consumers of chemicals:

• Pulp and paper—Output so far this year has run about 5% above 1955's. For the year as a whole, don't look for quite this big a gain. Output has been on a very high plateau for the past 11 months, paralleling over-all U. S. industrial production.

• Rubber products—Manufacturers have cut output by 3% compared with a year ago, and output for the entire year is now expected to average 5% under the record set in '55. Most of the decline has resulted from the 30% decrease in automobile production. But tonnage consumption of rubber chemicals may not be substantially affected—the 14-in. tires that are replacing the 15-in. model as standard equipment actually take more rubber, rubber chemicals per tire.

• Textiles—For a change, the textile industry is having two good years in a row. So far this year, mill output is about 5% above '55's, and the industry is running very close to capacity. Output of synthetic fibers and fabrics has slowed down a little; general textile inventories are increasing. So, the second half of '56 will see some decline in production as makers bring inventories into line. But for the year as a whole, output should run about 4% above '55's—a new record.

• Petroleum refining—Though refiners' production was 7% higher in the first half than in the comparable '55 period, it isn't likely this rate of increase will continue. Refining output for the full year should run about 5% above '55's.

• Chemicals—Output for the first half of the year in the chemical industry (which is, of course, its own best customer) was up about 3% over the last six months of '55 and about 10% above 1955's first half. Output during the coming six months is expected to continue to top last year's.

All of these predictions are based on the assumption that the steel strike will be short-lived. Whatever the length of this dispute, however, remember that strikes—even long and bitter ones—have rarely, if ever, been major turning points for business conditions.

•

Plans for Latin America's biggest aluminum plant are being formulated by engineers of Kaiser Aluminum and Chemical. The company plans a primary refining facility in Venezuela's Bolivar state, located near the government's Caroni River hydroelectric project.

Kaiser is also exploring the Guayana region of Venezuela, where government geologists report bauxite deposits that may total as much as 50 million tons.

Other companies that have surveyed industrial possibilities of the region: Alcoa, Reynolds and the M. A. Hanna Co. (Cleveland).

On the domestic aluminum scene, there's one company that's bucking the trend to the Ohio River Valley (*see pp. 25-27*). Harvey Aluminum last week recorded $44 million worth of mortgages in Oregon's Wasco County court house. Construction of its primary refining plant is slated to begin at The Dalles by Aug. 1, and must be complete by late 1958 in order to meet contract terms for power from the Bonneville Dam.

•

There may be an expansion ahead in silicon. Du Pont has purchased an isolated 10,500-acre tract near Cedar Mountain N.C., on which it may erect a silicon manufacturing plant. The site lies alongside the Little River, which at that point separates North and South Carolina. Construction plans "have not been completely developed" for the plant, which may be completed by late '57 or '58. It will employ some 200 persons when it begins operation.

•

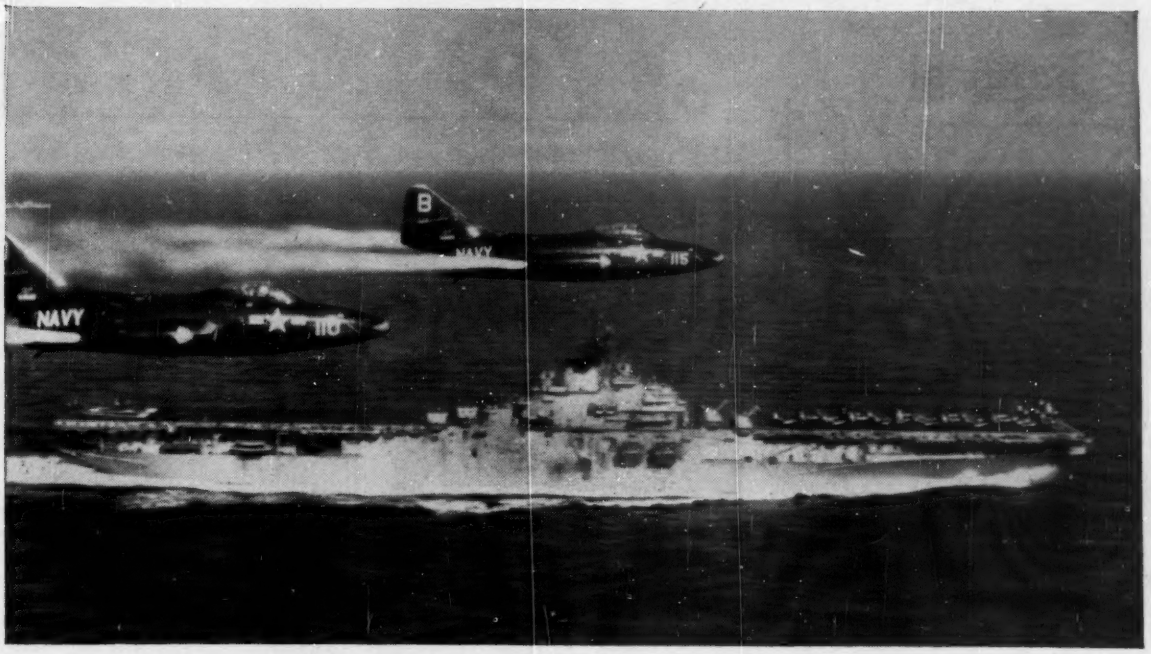
In the thick of pollution charges are the chemical firms along the Ashtabula, O., lakefront. Smog, reportedly traced back to the plants, has affected a large section of the city, prompting a city councilman to make personal investigation of damage to the area, now known as "Withering Heights." Another councilman is asking state aid for an investigation.

Meanwhile, in Texas, plant managers for Index Chemical and Merichem Co. (Houston) have had charges filed against them alleging that plant effluents have polluted Green's Bayou.

In the Pacific Northwest, Rayonier, Inc., has asked for a hearing before the Washington State Pollution Control Commission on a commission ruling (*CW Business Newsletter, June 30*) that bars the discharge into lower Puget Sound of wastes from its Shelton, Wash., pulp mill. It asks an explanation of commission charges of "undue pollution," and more information on the commission's "intensive studies" of the subject.

•

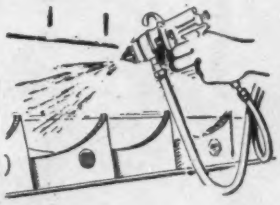
Minor memos—Dow's plants at Freeport, Tex., are shut down by a strike of 2,300 operating engineers. . . . International Minerals and Chemical has started production at new plants which produce nepheline syenite, mica and ground perlite. . . . Top contenders to replace Leonard Scheele as U.S. Surgeon General: Norman Topping of the Univ. of Pennsylvania, Herman Hilleboe, New York state medical director—or perhaps Deputy Surgeon General Palmer Dearing. Scheele resigned to become president (at a reported $60,000/year) of Warner-Chilcott Laboratories.



CHROMIUM CHEMICALS IN ACTION

The useful life of modern jet aircraft has been appreciably prolonged through the application of effective corrosion inhibitors. Chromium Chemicals in various forms are used at many stages of jet plane production.

Anodizing aluminum alloy parts with chromic acid forms one of the most effective protective coatings known today. Furthermore, it is an excellent base for the customary zinc chromate primer. Steel and magnesium assemblies also are painted with zinc chromate... and before magnesium castings are primed they are dipped in a bichromate bath.



These illustrations are examples of the ability of Chromium Chemicals to inhibit and prevent corrosion. Besides supplying many industries with superior quality chromium chemicals, Mutual offers information on the numerous other ways that these chemicals help to protect valuable materials and equipment. So, if you are in doubt about the best way to solve your corrosion problem, contact Mutual.

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MUTUAL CHEMICAL DIVISION

MUTUAL — ALLIED CHEMICAL & DYE CORPORATION

99 PARK AVENUE · NEW YORK 16, N. Y.

Allied Chemical

Chemical Week

July 14, 1956

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SOMLO, former Syntex owner, advises

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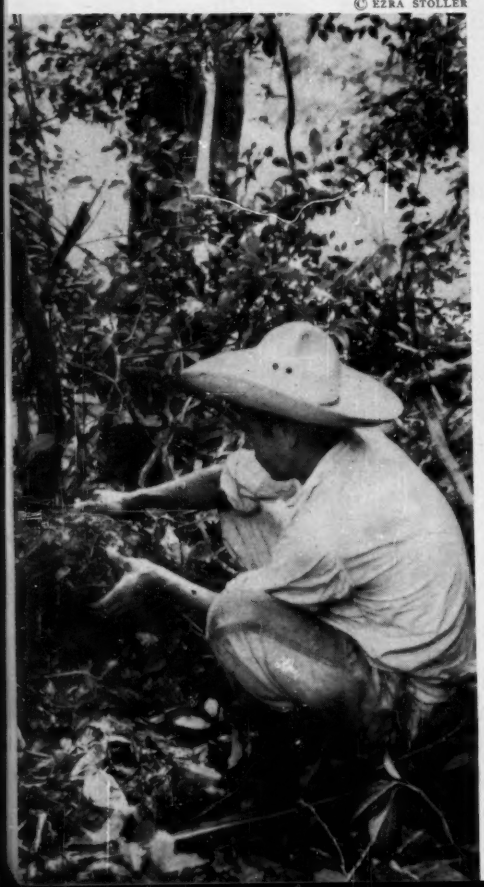
LAGOS, Syntex president. He knows

WIDE WORLD

LOYO, who controls raw materials.

Keys to the International Hormone Hassle

The complex story of Syntex, S. A., and its alleged grip on supplies of the lowly barbasco root—a cheap and effective raw material for the steroid industry—was opened to view last week in public hearings by the Senate Patent subcommittee in Washington.



© EZRA STOLLER

STEROID SOURCE: Mexican laborer harvests diosgenin-rich native root.

Of prime interest to manufacturers of cortisone, cortisone derivatives, and sex hormones is the possibility that antitrust action by the U.S. government may force release of large quantities of the Mexican barbasco root, whose high yield of diosgenin permits high-volume, low-cost production of many such steroids. The reason for U.S. action: a belief that American firms connected with Syntex are conspiring to limit others from access to the Mexican-controlled root.

The Interests: For U.S. drug houses, unrestricted commercial availability of the root would provide three stimuli. First, those firms currently making cortisones, male and female hormones and related steroids could widen their manufacturing efforts. In the second place, firms that have long wanted to get into steroid production could set up shop, compete on reasonable terms. Third, makers using ox bile, mares' urine, and the like, in older processes, would necessarily have to lower their profit margins, find ways of boosting yields, or convert to the root.

The History: Currently, Syntex is owned by Ogden Corp., a holding company owned by Allen & Co., a New York investment house, which, a few months ago, purchased it and its subsidiaries, American Syntex (Puerto Rico) and Chemical Specialties (New York). Until then, Syntex was headquartered in Mexico. Owners were Emeric Somlo and Federico Lehmann, both founders of the firm, and George Rosenkranz, another early investor. President of Syntex was, and still is, Licio Lagos, an influential Mexican lawyer and publisher.

Their proprietorship dates back to just before World War II. Then, Russell E. Marker, a brilliant but erratic scientist, was doing research at what is now Penn State University under grants from Parke, Davis. At PD's behest, he was seeking a vegetable source of the sapogenins, steroids that include the basic steroid framework with an easily replaceable side chain. Marker discovered a rich source in the plentiful cabeza de negro, a root found wild in Mexico. He devised a process for extracting it and assigned his patents*, by agreement, to PD. The latter, reportedly, chose not to exploit them. Marker, learning that the patents had not been registered in Mexico, moved there and began making progesterone in small quantities.

Later, fearing he wasn't getting his full share of the sales income, he approached Lehmann, then in business with Somlo at the Laboratorios Hormona, and offered to show them the process by which he extracted intermediates from the plant source. In 1944, Syntex was founded; Somlo

*Including U.S. patents 2,304,836, 2,306,635, 2,337,563, 2,337,564, 2,352,848, 2,359,772, 2,359,773, 2,366,204, 2,369,065, 2,376,708, 2,420,489, 2,430,988.

and Lehmann owned 60%; Marker, the other 40%. To market their products, they resurrected a nearly defunct distributing house in New York, Chemical Specialties, Inc.

Within a year, Marker was again dissatisfied. He quit, leaving Somlo and Lehmann with an incomplete knowledge of his processes. At this point, Somlo called upon Rosenkranz, another brilliant scientist, who came to Mexico from Cuba. After considerable work, he reconstructed the Marker processes. By 1951, the firm was producing quantities of progesterone, testosterone and estrone.

In the same year, a Mexican laborer brought in a sample of barbasco that yielded some 5% of its dry weight in diosgenin, twice that of cabeza. Now, the firm was on solid footing.

Meanwhile, in 1948, American Syntex was formed as a subsidiary in Puerto Rico, under the leadership of Irving Sollins, a Chemical Specialties employee. Sollins, a small stockholder, had ideas for promoting sales to drug houses through lower prices—but these fell on virtually deaf ears for several years. Finally, however, prices were dropped enough to interest a number of firms, including Pfizer and Upjohn.

In Dec. '54, Sollins, feeling that "Syntex was wiggling about," sold his share to Somlo, after trying unsuccessfully to interest Pfizer, Squibb, G. D. Searle, and Lehman Bros. in buying the Mexican firm. (Sollins shortly afterward started his own competing firm, Root Chemicals, Inc., with a subsidiary in Mexico.) Syntex remained in the hands of Somlo, Lehmann and Rosenkranz until the recent Allen purchase. Somlo is no longer formally active in the firm, but is reportedly available for advice.

The Case: For several years, the U.S. Dept. of Justice, spurred by complaints from domestic steroid producers, has been laying groundwork for an antitrust case that would charge Syntex, through conspiracy with its U.S. branches in New York and Puerto Rico, with restraining domestic producers from getting the vital root in reasonable quantities. It has hoped to prove that Syntex President Lagos, who has close connections with Mexican Economics Minister Gilberto Loyo, has been able to prevent other firms from getting licenses to harvest barbasco.

Syntex denies this, says that when it licensed U.S.-held hormone patents seized from Schering, A. G., it signed affidavits that it would in no way hamper distribution of the raw material. Sources close to the Justice Dept., however, say the government has strong evidence to the contrary.

Moreover, Allen & Co., as the new Syntex owner, has reportedly failed to come to terms on releasing supplies of the root to others, using the argument that the problem belongs to the Mexican government and to no one else. Several firms (*see box*) have been operating with dribs and drabs of material that were released by Mexico only after prolonged and tortuous debate with Minister Loyo.

Other Syntex arguments:

- The U.S. ought to examine monopolistic markups of American drug firms in the steroid field.
- There isn't enough demand to support more than one company in Mexico.
- There is a shortage of root in Mexico. (A Mexican Dept. of Agriculture report issued in 1955, however, lists a 100 years' supply.)
- Syntex has asked no privileges from the Mexican government, and thus can't be charged with discrimination.

The current Congressional airing of the Syntex story, of course, does not pretend to be more than an investigation of complaints that U.S. companies are involved in an illegal conspiracy. But the real question is: What will come next? One possibility: a court proceeding by the U.S. Justice Dept. using its own evidence and that developed by the committee. Committee evidence could also be used in a private antitrust suit. Too, since much of Syntex's production involves processes and materials covered by U.S. patents held both by the government and by Parke, Davis, it's possible that the next move might be to embargo the importation into the U.S. of such materials.

But it's also possible that the next move will be made by Syntex or the Mexican government, which could take steps to "loosen" the present trade in barbasco-derived steroids.

HOW THE INTERESTS LIE

In Mexico

Julian Laboratories—processing plant on paper, site owned, but can't get barbasco from Mexican sources.
Hormosynth, Inc.—has plant in operation, can't get root.
Root Chemical Co.—(via subsidiary Productos Esteroides) in production, with tenuous hold on minimum of root.
Hormona, S. A.—owned by Syntex manager Emeric Somlo, apparently has open channel to root.

In the United States

American Ciba—manufactures sex hormones under older patents.
Glidden—soya-derived sterols will meet competition.
Merck—makes steroids from more expensive bile acids.
National Drug Co.—Distributes hormones, has made statements favoring open supply.
Parke, Davis—owns basic patents on root derivation, open to licensing, is probably interested in starting manufacture.
Pfizer—currently has supply agreement with Syntex, would benefit from greater, lower-priced root supply.
Schering—has built pilot plant in Mexico, needs root to manufacture for own needs.
G. D. Searle—makes cortisones and sex hormones, could use root supply.
Squibb—interested in steroids, at one time listened to offers to buy Syntex.
Upjohn—gets limited materials for progesterone from other Mexican firms.

Elsewhere

Dutch Organon—makes steroids partly from cholesterol, partly from barbasco supplied by a variety of Mexican firms.

BLACK STAR

BIG BOOM: An extra 62 million lbs./year of explosives will be used for new superhighways.

Paving the Profit Road

Chemical producers had good reason to be glad as President Eisenhower last week signed into law the new highway bill. The nationwide road building program, which will boost the volume of federal-aid construction by $2.5 billion/year, will bring new sales and profits to chemical process industries.

In the current calendar year, total U.S. spending for construction of streets and roads is about $5.15 billion. In three to five years, this annual volume will increase to more than $8 billion—and finally will level off at about $10 billion/year. Here's the chemical angle:

Each additional billion dollars of construction will take about 16 million bbls. of cement, nearly 1 million tons of bituminous materials (mostly asphalts, some coal tars), more than 18 million lbs. of explosives plus less specific, but substantial, amounts of other chemicals and chemically processed materials.

Boom for Explosives: The $175-million/year explosives industry will probably gain most. Ralph Gottshall, president of Atlas Powder, estimates that for every additional billion dollars spent on road building, there will be an increase of about 3½-4% in sales of dynamite and blasting supplies. Part of this rise will be in explosives used in excavating the road itself; the rest, in those used to produce the crushed rock, cement, steel and other materials needed to finish the highway.

But there are other chemical products with a large stake in the new highway program. Look at air entraining agents used in concrete, for example. A 4-lane, 9-in.-thick cement highway uses 8,500 bbls. of cement for each mile—not including structures such as bridges and overpasses. And all cement, however used, requires 4-5% of chemical air entraining agents. One producer estimates that this would amount to around 500-750 gal. for every mile of such a highway—and 40,000 miles of interstate highways are planned.

Silicones Coming Fast: Since concrete does not completely cure for several years, coating of newly constructed roadway with silicones to prevent moisture damage is becoming an accepted practice. A silicone manufacturer reports that treatment of a mile of 4-lane highway would require 2,600 gal. of 2-5% silicone solution. Silicones are now used on most highways in Massachusetts. Too, they have been used on the concrete bridges of the New York Thruway.

For new highways constructed of asphalt, chemical antistripping agents will be used. A manufacturer reports that a 4-lane, 5-in. highway requires approximately 350 gal. of such material for every mile.

Tally on Paint: Regardless of the base material, superhighways are sure to boost consumption of paints and enamels. Painting a mile of 4-in. center stripe takes 17 gal. of enamel. A 6-in. stripe—the most popular—requires 26 gal./mile. Edge-marking of pavements with solid lines is becoming common. And this, together with the painting of guard rails, steel bridges and a huge number of new traffic signs, will help swell the over-all volume. New Jersey Turnpike officials estimated that in 1955 they used 30,000 gal. of paint on their 118-mile superhighway.

Fertilizer Growing: Fertilizer and

herbicide producers see big new markets emerging from the highway program. Though it's difficult to get any specific estimates from highway people, one horticulturist reports that the grass on a 50-ft. center island, plus that lying 50 ft. on either side of a highway, would require about 8 tons of fertilizer per mile, as well as 90 lbs. of weed killer. Multiply this by the 40,000 miles of interstate highways planned, not to mention the less-traveled roads, and you get some idea of the market possibilities.

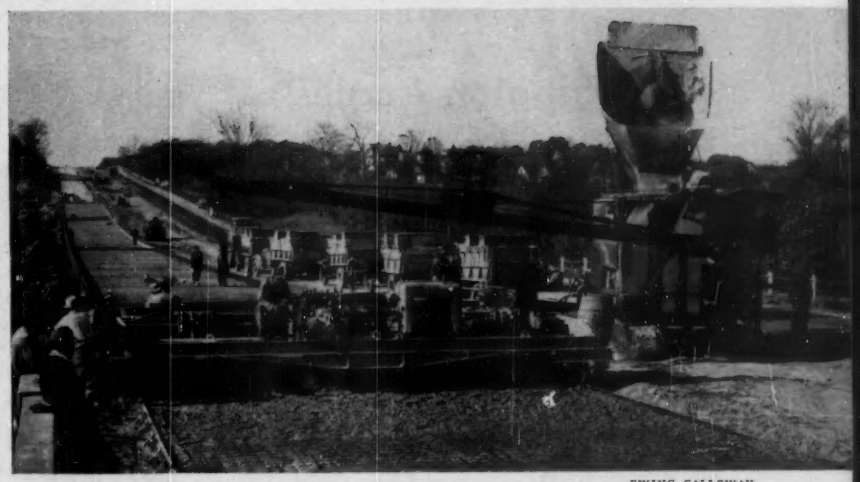
Though not yet widely accepted, compounds to retard the growth of grass—primarily U.S. Rubber's maleic hydrazide—may mean other profits. One producer estimates that about 20 lbs./mile would be needed to spray an 8-ft. band along both sides of a highway, thus reducing costs of mowing the grass.

Another relative newcomer is rubberized asphalt roadways. Rubber has been incorporated in several test roads to make the riding surface waterproof and prevent asphalt oil from bleeding to the surface. But the cost will probably have to be lowered to gain general acceptance. Such rubberizing now costs $2,500 extra per mile for the average 24-ft.-wide road.

Maintenance requirements also will rise as more highways are completed. Besides weed killers and fertilizers needed for summer upkeep, large quantities of sodium and calcium chlorides will be needed for winter maintenance. Officials of one large interstate parkway report that they used 50-60 tons of the ice-melting material for every mile of highway last year.

No Letup in Traffic: The highway program may have to be expanded even further if automobile traffic continues to increase at its present rate. New Jersey Turnpike officials report that this road is handling more traffic right now than engineers had predicted for 1984. More vehicles traveled on it during the first six months of '56 than had been predicted for the entire year. Other turnpike and parkway commissions report generally similar findings—though there are exceptions.

The expected boost in traffic, along with the hike in federal and state construction spending, makes it sure that new markets will open up for many chemical producers. And indications are that those markets may be even greater than observers had predicted.



EWING GALLOWAY

CEMENT: Highway contractors will use up to 113 million bbls./year of cement.

BLACK STAR

CURES: 2,600 gal./mile of silicone solution may be used on 'uncured' cement.

PAINT: It takes 26 gal. of white enamel for each mile of center stripe.

Washington Angles »

» **New assistant director** of the Office of Defense Mobilization will be former Pennsalt President George B. Beitzel. He'll take over Sept. 1 as materials and production planning chief.

» **Salk vaccine shortages are all but over,** according to federal officials. Reason: rising output has produced plentiful supplies in many areas and will soon catch up with demand in others. Floridians have already turned back a recent allotment, while, elsewhere, officials report lack of interest in vaccination of this year's teen-age priority group.

» **A number of chemically significant bills** have been passed or reported out of committee recently:

• A two-year suspension of duty on imported alumina when used in making aluminum has cleared the House, is expected to get Senate o.k. soon.

• The House Commerce Committee has approved new rules to eliminate lengthy hearings on noncontroversial regulations proposed for foods, drugs and cosmetics.

• The same committee set the stage for final action on a Senate-passed measure allowing the Bureau of Standards to set up a working fund with the fees it gets for testing ordered by business clients.

On other bills, action is less certain. A House subcommittee put off action "indefinitely" on a bill to up the size of phosphate leases on federal lands. And, opposition from the House Commerce Committee has slowed progress on a food and drug bill to permit re-export of products that fail to meet FDA standards.

» **The bill to promote research** on conversion of farm products to industrial goods was explained to a Senate Agriculture Committee by Sen. Homer Capehart (R., Ind.) this week. Capehart would pump $100 million into government pilot plants for this research.

» **Higher starting salaries** for this year's college crop of scientists going into government work have been approved by the Civil Service Commission.

EXPANSION

Vinyl Resins: General Tire & Rubber Co. has now started work on its scheduled 50% expansion of its Ashtabula, O., vinyl resin plant. Production up to now has been 25 million lbs./year.

•

Electrolytic Manganese: Foote Mineral Co. will spend $2 million in expanding an electrolytic manganese unit at Knoxville, Tenn. The expansion will raise capacity to 22 million lbs./year.

•

Butylenes: Humble Oil Co. plans to build a $27-million catalytic cracking unit at the company's Baytown, Tex., refinery. The unit will produce components for butyl rubber and butadiene. Capacity: 55,000 bbls./day of crude oil.

•

Rare Metals: Transition Metals & Chemicals, Inc. has bought a 10-acre factory site in Wallkill, N.Y. The company will refine high-purity chemical derivatives of tantalum, columbium, vanadium, molybdenum, rhenium and other rare metals.

•

Cement: Two companies have made plans for added facilities.

• Lehigh Portland Cement Co. will build a cement-making plant in Dade County, Florida. Cost: $20 million.

• Medusa Portland Cement Co. will build a $12-million, 2.5-million bbls./year plant near Wampum, Pa. Completion is scheduled for late 1957.

COMPANIES

Ideal Cement Co. (Denver) has sold its 123,196 shares of stock in Missouri Portland Cement Co., at a reported price of $6,282,996.

•

Glenbrook Chemical Co. has been purchased by the Medical Gas Division of Thomas A. Edison, Inc.

•

Metal Chlorides Corp. has been sold to Salem-Brosius Inc. in exchange for 7,810 shares of S-B stock, valued at approximately $60,000.

•

Hercules Cement Co. will ask stockholders on Sept. 5 to approve a 3-for-1 stock split.

•

National Gypsum Co.'s offering of 416,666 shares of common stock has been 97% subscribed. The company reports that 405,478 shares have been taken by shareholders; the remaining 11,188 unsubscribed shares have been bought by underwriters led by W. E. Hutton & Co. and Blyth & Co.

•

Cosden Petroleum Corp. has set July 25 for a special stockholder meeting to vote on a proposal to increase authorized stock from 1.2 million to 4 million shares of $1 par value.

FOREIGN

Synthetic Fiber/Ireland: Chemstrand Corp.'s British subsidiary, Chemstrand Ltd., is now blueprinting a $10-million Acrilan fiber plant for Coleraine, Northern Ireland. It's scheduled to be in operation by Jan. 1959.

•

Drugs/India-Russia: T. T. Krishnamachari, Indian Minister of Commerce and Industry, said his government is planning to send a team of Indian experts to Russia to explore the possibilities of Indo-Russian collaboration in drug manufacturing.

•

Bauxite/Haiti: Reynolds Metals Co. will soon begin mining bauxite in Haiti through its newly organized subsidiary, Reynolds Haitian Mines Inc. The new Haitian installation, scheduled for completion early next year, will produce 400,000 tons/year of bauxite.

The Ohio's New Boom—Electrochemicals

The construction work and the barge in the picture below are symbolic. While barge traffic and building of new plants have never been absent from the Ohio River Valley, they have a new meaning today. The fortunate combination of cheap water transportation, proximity to markets and new developments in coal-burning technology that have made possible electric power generation at rates well under a half cent per kilowatt has brought the Ohio River a new boom: three companies, so far, are erecting primary aluminum plants there; two or three others may soon be added; and other new electrochemical plants may not be far behind. The list so far:

- Kaiser Aluminum & Chemical is building a 220,000 tons/year aluminum plant at Ravenswood, W. Va., to be in production by the end of 1958.
- Aluminum Co. of America will soon begin construction at a site 18 miles east of Evansville, Ind., on a 150,000-tons/year smelter and a 375,000-kw. electric plant. Completion is scheduled for sometime in 1958, though some production is expected in '57.
- Olin Mathieson Chemical Corp. has begun construction at two sites near New Martinsville, W. Va., of a 60,000-tons/year aluminum refining and fabricating unit and related facilities (*see pp. 26-27*) also with a 1958 due date. It is designed for eventual doubling in size. But such a decision, says Walter O'Connell, executive vice-president in charge of the project, "is a bridge that we haven't yet crossed."
- Revere Copper & Brass and St. Joseph Lead—as well as Reynolds Aluminum—are also reported to be considering such sites for aluminum production.

Interest Anew: The Ohio Valley, of course, has always been a prime chemical area for its barge transportation and for supplies of such raw materials as salt and limestone. But the majority of companies seeking locations for electrochemical plants have long looked to other areas—the Pacific Northwest, near Hoover Dam, or within the Tennessee Valley Authority market area—when cheap power was the chief attraction.

In recent years though, the roseate glow that wreathed the listings of power costs from such areas has subsided—leaving a gray reality. Water shortages in the Northwest have caused curtailment of some electrochemical production; steadily increasing rail freight rates have affected profit ratios of many plants without good barge connections to their markets.

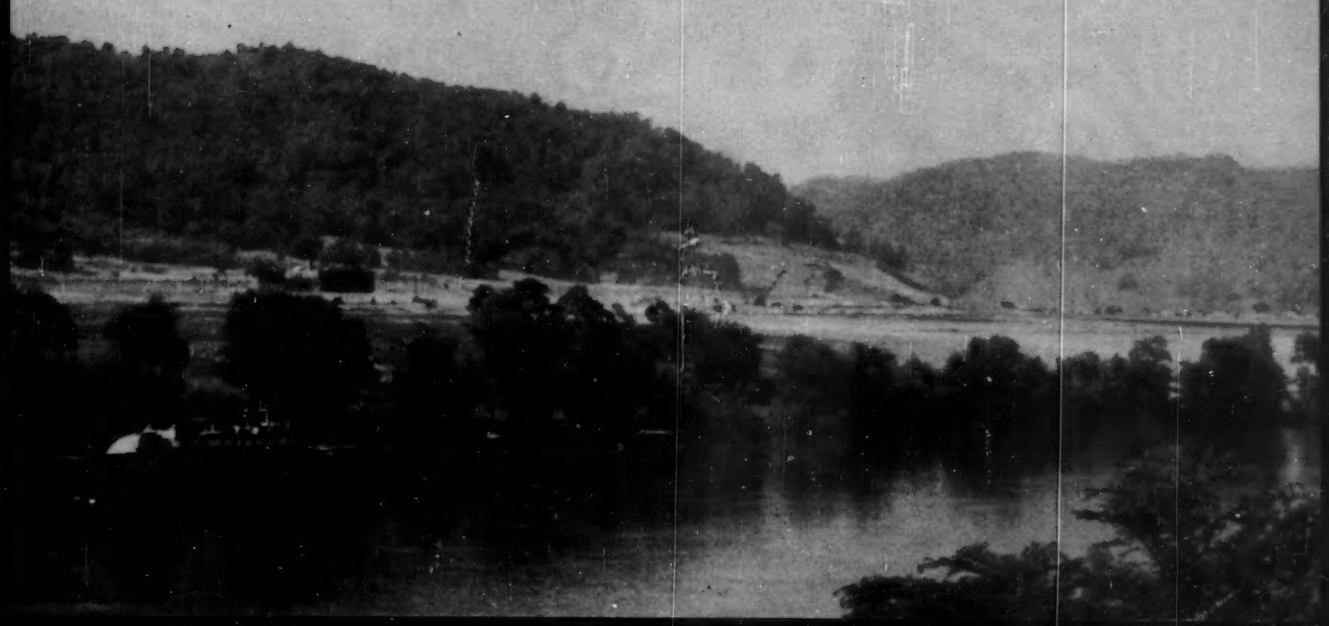
As a division manager for one aluminum producer put it: "You can easily negate a 2-mills/kw. advantage in power costs by having to ship aluminum an extra thousand miles."

Better Burning: Meanwhile, new technology in coal combustion has brought down cost of power from coal to a level that can equalize a lot of freight. As a result, power has become available in the Ohio Valley area at a 5.5- to 6-mill rate on a high load factor, large-block basis. This price—while attractive to many—was not enough for aluminum producers. As a result, you have joint deals. For example, Alcoa will use its own coal deposits and build its own power plant, bringing in Peabody-Sinclair and Southern Indiana Gas & Electric Co. as operators.

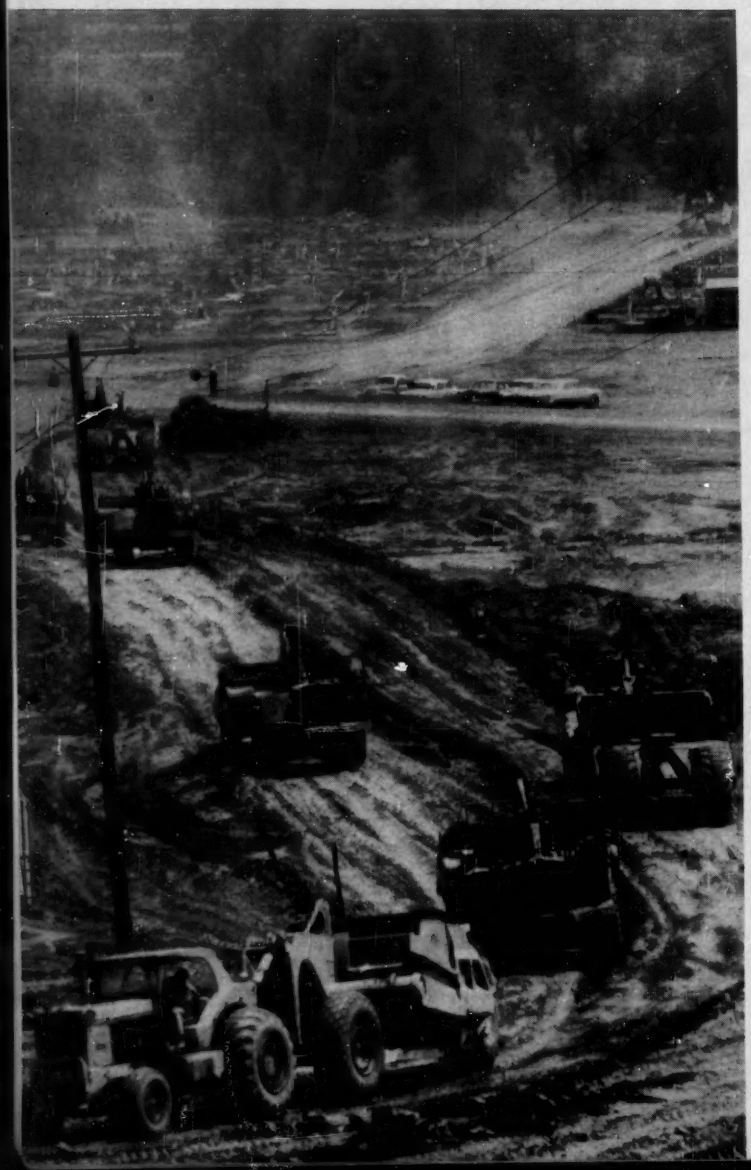
And Olin Mathieson has a joint-operating agreement with utility and coal-mining partners.

What are the power rates that the companies are figuring on? OM's O'Connell puts it this way: "You can hit both sides of 4 mills depending on the amount of money you spend for a power plant—and whether you have the money available."

But whatever the figure, it should be low enough to draw other electrochemical firms into the area.



PHOTOS—CLYDE HARE



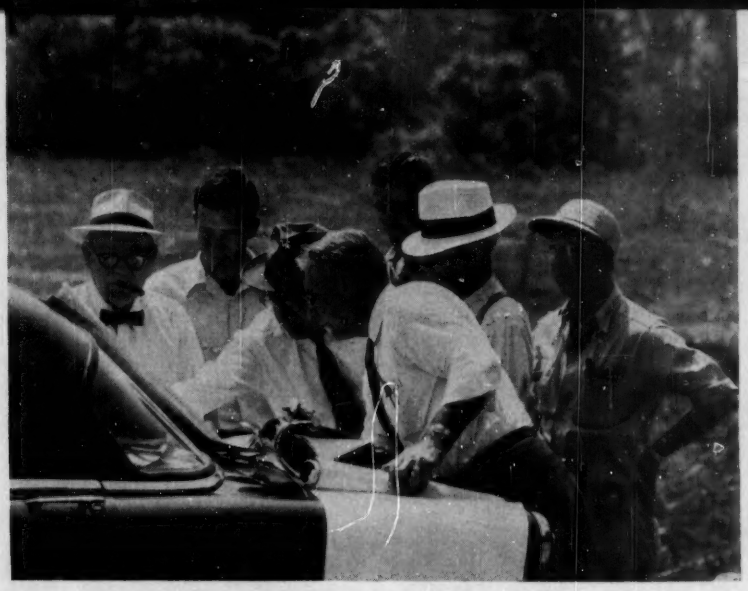
A Wry Justification

FOR OLIN MATHIESON, whose abuilding aluminum reduction plant at Clarington, O., is shown on these pages, the decisions by Kaiser and Alcoa to locate new plants in the Ohio Valley come as wry justification of its own plans. Ever since the then Olin Industries made its first studies for a primary aluminum plant back in 1949, there's been no question that, when built, it would be located on the Ohio River.

In Olin's studies, it has been assumed that the company's market for fabricated aluminum will be centered in about the same place as its current fabricated metal market—a little south and east of Terre Haute, Ind. With such an assumption, a plant could not economically be located away from the Ohio Valley—a point that Olin has patiently explained to Congressional investigating committees, and to others who have questioned its choice of an aluminum plant location.

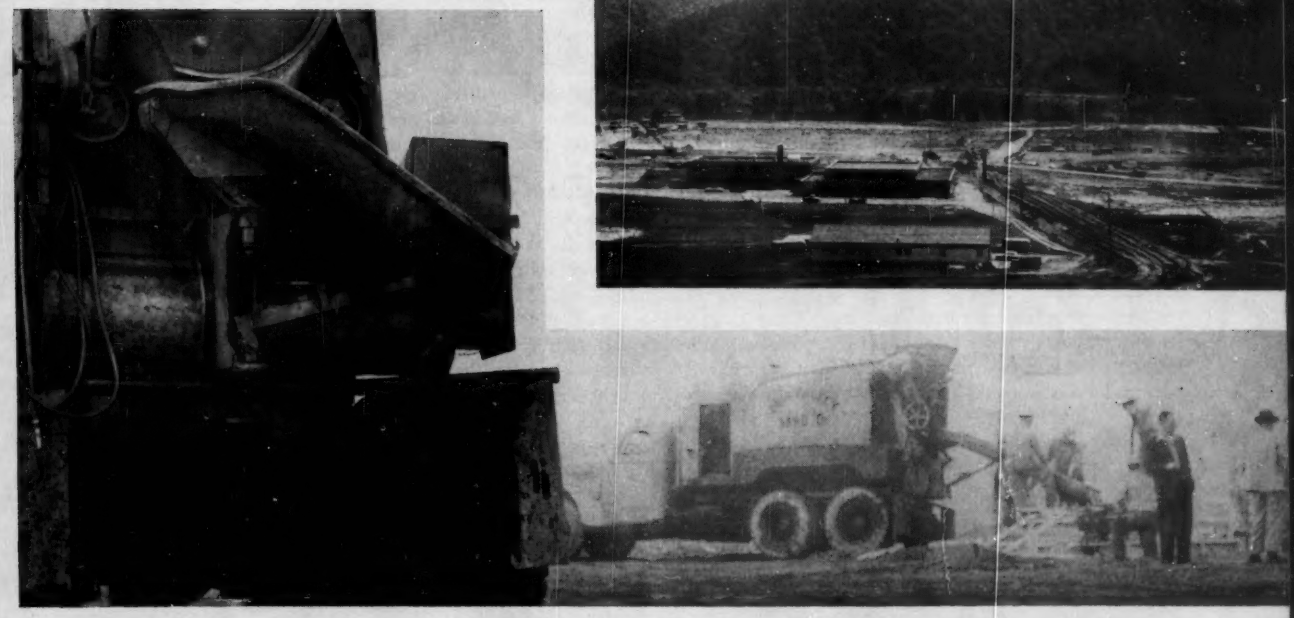
The company owns some 1,300 acres at Clarington—and could buy more land in the hills shown in the background of these pictures. Constructor F. H. McGraw & Co. is using some $2 million worth of earth-moving equipment in preparing the site. The equipment was barged up the Ohio to Clarington and to the cross-river site of the coal mine, carbonizer and the 450,000-kw. power plant, which will supply needed energy. Operations of the utilities units will be conducted jointly by OM, Pittsburgh Consolidation Coal and American Gas and Electric.

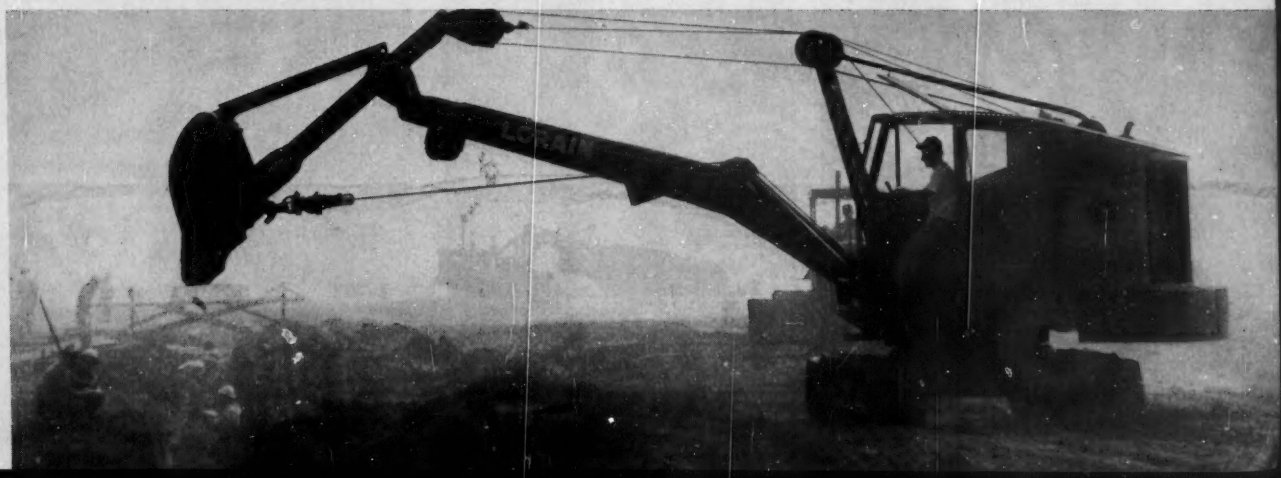
Originally, the aluminum smelting and fabricating plants were also to have been on the 1,000 acre site at Cresap Bottom, W. Va., but it was felt that operations might be too crowded.



Planning for the Olin Mathieson plant involves many groups. At left, Ohio State Highway and Pennsylvania Railroad men make arrangements for road and rail connections.

The school bought by the company (below) for its future executive offices stands in the middle of the plant area.





Industrial Security: Two Versions

U.S. chemical industry management —at times annoyed by industrial-security red tape—has thus far been spared from making the fateful choice: top-level security firing or government defense contract.

Not so fortunate, however, is Britain's largest chemical concern, Imperial Chemical Industries, Ltd., which recently was forced to remove an assistant solicitor from contact with classified information, or lose its government business. ICI—claiming that it was impractical to place the solicitor, J. H. A. Lang, in nonclassified work —discharged him, touching off one of England's liveliest governmental controversies in recent years.

That this situation has not come up in this country's chemical industry is in no way due to inadequacies in the U.S. system. The Pentagon's Personnel Security Policy—which handles such matters—requires that before a company can prepare a bid, or negotiate a contract for classified defense work, all its key personnel must be cleared by the government for access to such classified work. If a top official of a company attempting to secure classified contracts is denied clearance, the Pentagon can—and has in a few cases, which it steadfastly refuses to disclose—demand that the person be discharged. The company must comply, or lose its "facility clearance."

But there the similarity between the British and U.S. systems ends. The British system of appeal for nongovernment workers is hazy—a primary reason for much of the criticism heaped upon the government as a result of the Lang firing. The U.S. system, on the other hand, has an elaborate policy of review.

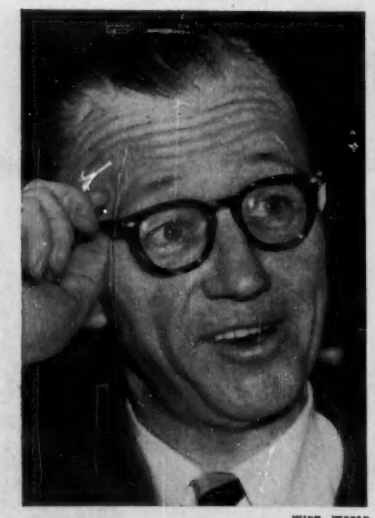
In the U.S., before an individual can be denied clearance, the case must pass through hearings and investigations by regional and Washington review boards. There is also an opportunity for further appeal before a central review board in the Pentagon headed by the Office of Personnel Security Policy director, Jerome D. Fenton. Fenton—until recently a Pan American World Airways' assistant vice-president in charge of industrial relations—reports to the Assistant Secretary of Defense for Manpower, Carter L. Burgess.

Criticism In England: Liberal and Labor members of the British Parliament—as well as the local press—were extremely free with criticism of the government's handling of the ICI-Lang case, citing a lack of adequate appeal machinery and the opportunity for arbitrary government action in future cases. A recent Privy Council white paper recommended that the same rights of appeal available to government employees be made available to nongovernment workers denied clearance. The method of appeal would be before a tribunal of advisors from the Ministry pressing the charges. In Lang's case, this was the Ministry of Supply headed by Reginald Maudling.

Lang further added to the controversy when—in an open letter to the press—he withdrew previous expressions of thanks to Sir Cyril Musgrave, permanent secretary to the Ministry of Supply, for having been allowed to present his case "fairly." Lang said in the letter that he felt that he had been "tricked."

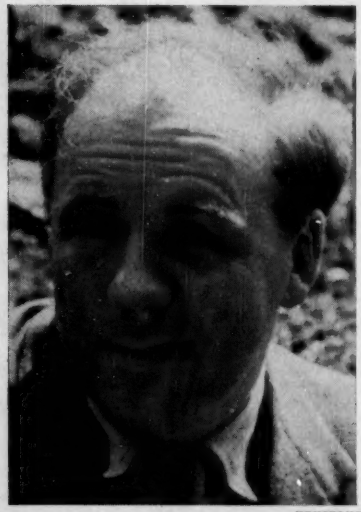
The reason for the withdrawal, Lang said, was the government's failure to fully present its charges. He had been led to believe, he added, that the principal charge was that his wife had been, prior to their marriage, a Communist.

On this basis, Lang asserted, he built his defense, in discussions with Musgrave. It was after the expression of appreciation for a fair hearing that Lang learned that the government had other charges, which it refused to divulge to Lang, the public or Parliament. And the hassle was further magnified by the fact that this was Britain's first instance of government



WIDE WORLD

WIDE WORLD



KEYSTONE

CONTRAST: From U.S.'s Fenton (left), adequate checks; from Britain's Maudling and Lang (right), controversy.

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pressure to force an industrial concern to fire an employee.

U.S. Red Tape: One U.S. chemical manufacturer willing to express its views on industrial-security policy is Stauffer Chemical Co. (New York). Stauffer admitted that its executives have found the security regulations trying at times, and that the company was doing everything it could to lessen the burden imposed on these executives.

Steps taken by Stauffer include the use of professional fingerprinting firms to take executives' fingerprints within the confines of the plant—rather than at the police station, and the passage of a special board resolution banning uncleared directors from access to classified information until such time as those directors received clearance. The latter move, explained Stauffer, permits the company to go ahead with classified government contracts while the government is investigating board members who have never been cleared for classified work.

Stauffer—in defense business only a short time (since the Korean War, when it made a delousing powder to overcome DDT-immune Korean lice) —is reluctant to offer suggestions for changes in the present personnel-security policies. The company admits that with all the official red tape and demands on executive time, the regulations fill a need—and they appear to be working.

A Complex System: The U.S. industrial-security program is extremely complex. It involves hundreds of Defense Dept. officials—in Washington and in regional military offices—and reaches into the industrial lives of at least 2,000 different firms (chemical and others) that now hold military contracts or subcontracts. Such a system must be detailed, and designed to cover all possible situations.

That such a system has adequate checks against arbitrary government action and against stripping the individual of his constitutional rights is sufficient to assure management that executive dismissals in this country—if and when they occur—will not be open to widespread criticism. The Lang case in England—and the resulting hue and cry—serve to point up a U.S. system designed to give maximum security along with maximum freedom of personal and corporate activity.

New Lineup on Every Job

With expansion still a dominant theme in the chemical process industries (see p. 25), systems for choosing strategic plant sites have necessarily come to be among the most refined scientific management methods.

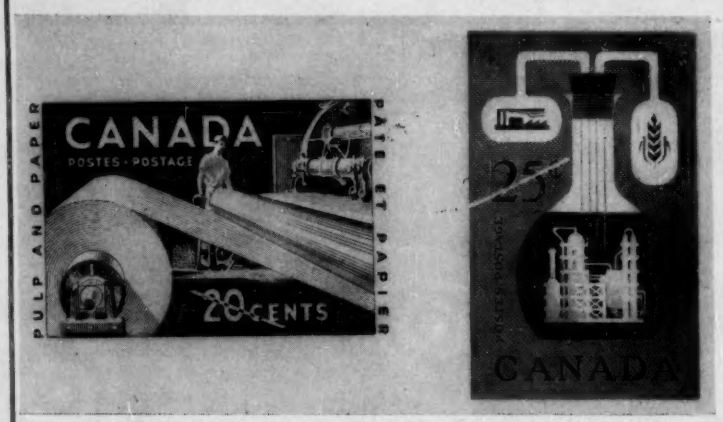
Chemical concerns can't afford to treat site selection lightly. For one thing, freight charges on bulk chemicals are such a large percentage of delivered costs that a poorly placed plant can quickly be priced out of production by a shrewdly situated competitor.

In the case of large chemical companies that have been racking up all kinds of growth records since World War II, site selection systems have been devised and improved to the point where they are almost foolproof.

No Snap Judgment: These systems provide three general safeguards: (1) use of a relatively large number of specialists, either employees or outside consultants; (2) provision for consideration of a large number of pertinent factors, which by now are well known; and (3) plenty of time allowed for investigations and studies.

As to amount of time devoted to these determinations, it's worth noting that Bowaters Southern Paper Corp. took more than seven years to decide on a site at Corner Brook, Tenn., for a big newsprint mill. In the same vein, a pair of Du Pont engineers worked for 13 months—traveling 20,000 miles and inspecting 87 possible sites—on the fourth step (*see table, p. 32*) toward locating a Dacron polyester fiber plant near Kinston, N. C.

Relative importance of site-selection factors varies greatly with each project. One kind of plant must be close to a certain market; another will have to be next to an oil refinery; a third may need cheap electric power. For this reason, Du Pont, for example, makes



Styled in Stamps: 2 Industries

IN RECOGNITION of how much they mean to the Canadian economy, two of that nation's biggest industries—chemical processing and manufacture of pulp and paper—are depicted in Canada's newest postage stamps.

Postmaster General Hugues Lapointe says the red and white 25¢ stamp in the nation's "secondary industry" series—designed by A. L. Pollock of Toronto—pays tribute to the contributions of chemistry and chemical engineering. It shows a chemical plant in a laboratory vessel; glass tubes extending from the top enclose a spike of wheat and a factory, indicating that chemical plants serve both agriculture and industry. The green and white 20¢ stamp in this series shows a workman tending a paper machine, and was designed by A. J. Casson, also of Toronto.

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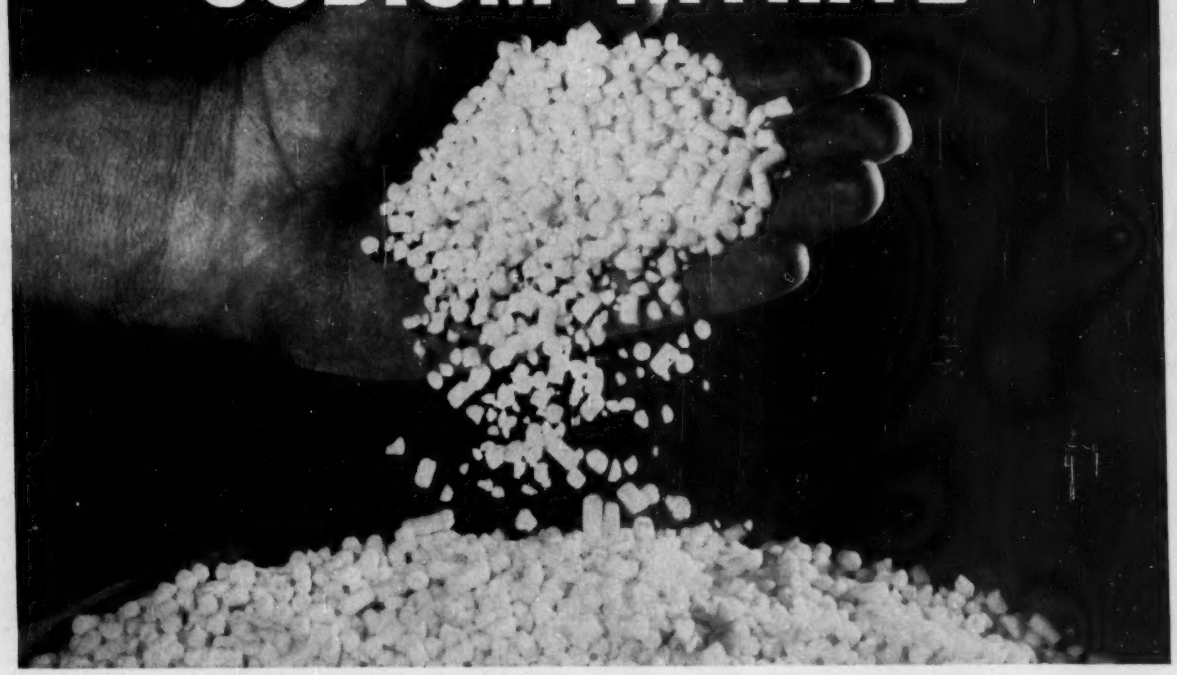

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2	Preliminary evaluation of several large general areas	Specialists in: Economic analysis Market research Manpower Meteorology Power availability Raw material sources Transportation costs	Proximity to raw materials and markets Transportation facilities and costs Availability and costs of fuel, power, process water Labor market Climate
3	Selection of various favorable locations within most promising region		
4	Intensive office and field study, plus economic analysis, to make final selection	Specialists in: Land costs Community relations Site surveying Soil mechanics Manpower Tax liability Water and wastes plus legal counsel; recommendations go to production manager and top management for final decision	All above factors, plus: 'Lay of the land' with respect to cities, streams, harbors, railroads, highways, pipelines, transmission lines and other industrial plants Soil and drainage Land costs and tax rates Nearby communities, living conditions, local governments, schools, hospitals, recreation Labor supply, prevailing wage rates, history of industrial relations in the locality

no attempt to keep together a permanent committee on plant location; instead, the company picks a new lineup of specialists for each new plant.

Not Just Realtors: Naturally, there's a lot more to the job than just designing a plant and then finding a piece of real estate to match. On the Corner Brook newsprint project, for example, Bowaters really had several teams in action. While production people were sizing up parcels of property in the Tennessee forest regions, the company had other staff members out attending to such chores as: liaison with local authorities; assuring raw material supplies; preliminary negotiations for power, fuel and water; inquiries as to possible tax exemptions; finding out about fire protection arrangements; and making other business contacts to make sure that the site eventually picked would be "right" in every possible way.

One possible incidental gain: the thoroughness, objectivity and successfulness of chemical companies' site selection task forces are undoubtedly giving the public a high impression of the entire industry.

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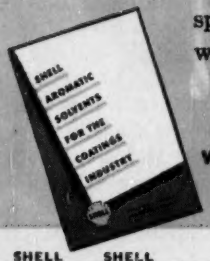

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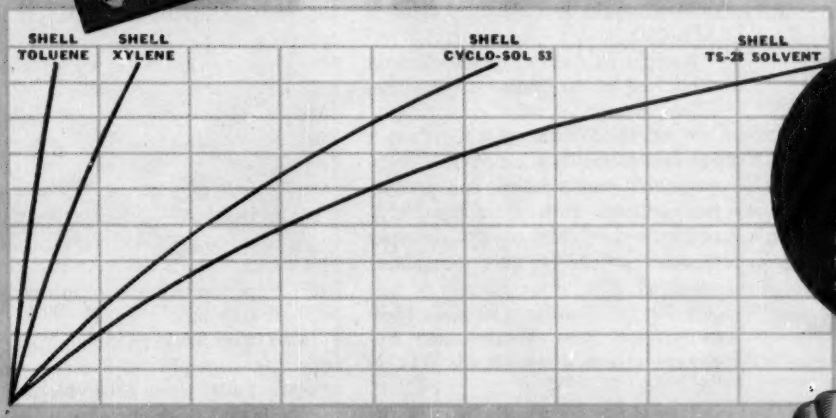

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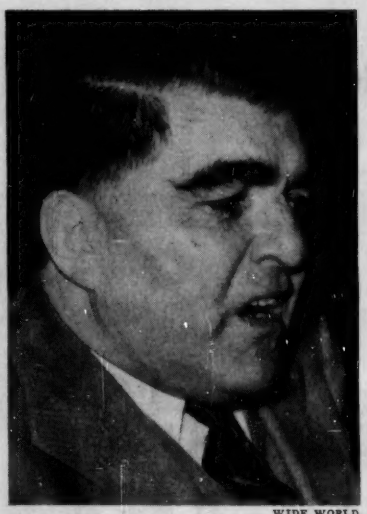


WIDE WORLD

DISTRICT 50'S LEWIS, VACCARELLA: Their two triumphs presage . . .

No Stampede to AFL-CIO

As the AFL-CIO's two chemical unions get set this week to crank up their centrally subsidized organizing drives, they'll be trying to live down two significant defeats sustained late last month in upper and western New York state.

Both defeats were at the hands of District 50, the United Mine Workers' "catch-all" unit headed by A. D. (Denny) Lewis—younger brother of UMW chieftain John L. Lewis—and were inflicted on Oil, Chemical & Atomic Workers, regarded as the more militant of the two chemical clans in AFL-CIO.

Returns in the two plant elections conducted by the National Labor Relations Board:

- At Allied Chemical & Dye Corp.'s Solvay Process Division plant in Syracuse, N.Y., maintenance and production workers—in a more than 95% turnout—voted 953 to 834 to reject OCAW as their collective bargaining agent.
- At the Stauffer Chemical plant in Niagara Falls, hourly rated employees turned down OCAW 114 to 76.

Vote of Confidence: Technically, the Solvay and Stauffer workers were only refusing to let OCAW bargain for them. District 50 was not on the ballots at either plant, because UMW has steadfastly refrained from complying with the Taft-Hartley Act, hence is not eligible for NLRB services. Actually, the polls can be regarded as votes of confidence for District 50, which has represented the companies' workers for quite a few years and which—in all probability—will now continue to be recognized by Solvay and Stauffer managements as the employees' bargaining agent.

These two elections may point up a sharp upturn in the 15-year rivalry between District 50 and the two AFL-CIO chemical unions. Unless AFL-CIO meets with unexpected success in its rumored overtures for UMW to reaffiliate, AFL-CIO unions will be at liberty to keep on trying to raid District 50 locals at every opportunity.

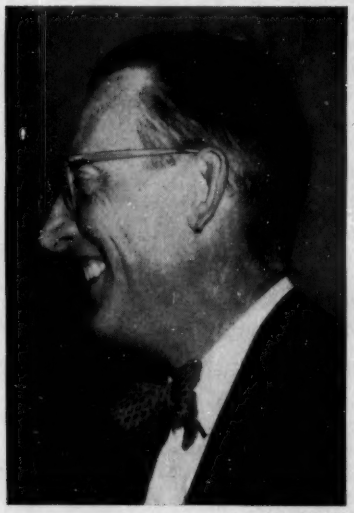
Relations between District 50 and International Chemical Workers Union (AFL-CIO) have been decidedly unfriendly over the past two years, with a few dissident ICWU locals switching to District 50. OCAW opened fire on District 50 early this year by taking over a pair of formerly District 50 locals in Canada.

Old-Timers Stick: In explaining District 50's triumphs at Syracuse and Niagara Falls, some observers credit the thesis that these chemical workers —holding steady jobs at relatively high pay—are fairly conservative in social and economic outlook and feel that they can trust District 50 to keep working for increased benefits without rocking the boat. On the other hand,

the employees know that OCAW is contemplating somewhat aggressive organizing and bargaining tactics for use at all plants of some large chemical companies.

"We think we won out because we've given our members good service," says Peter Vaccarella, District 50's regional director at Niagara Falls. "The men realized it and stuck with us, especially the old-timers." Wage rates at Stauffer are good and fringe benefits are very good, he added, and the union has been alert in processing any grievances that came up; the element of dissatisfaction that may have encouraged OCAW to attempt a raid stems from the fact that maintenance workers have been getting considerable overtime work and pay, while production workers have had a lesser share.

It's an odds-on bet that there'll be more clashes this year between District 50 and AFL-CIO unions; but most of the 22 chemical plants singled out for the new organizing drive are believed to be nonunion now. In any event, look for a record volume of unionizing efforts at chemical plants during the next 12 months.



WIDE WORLD

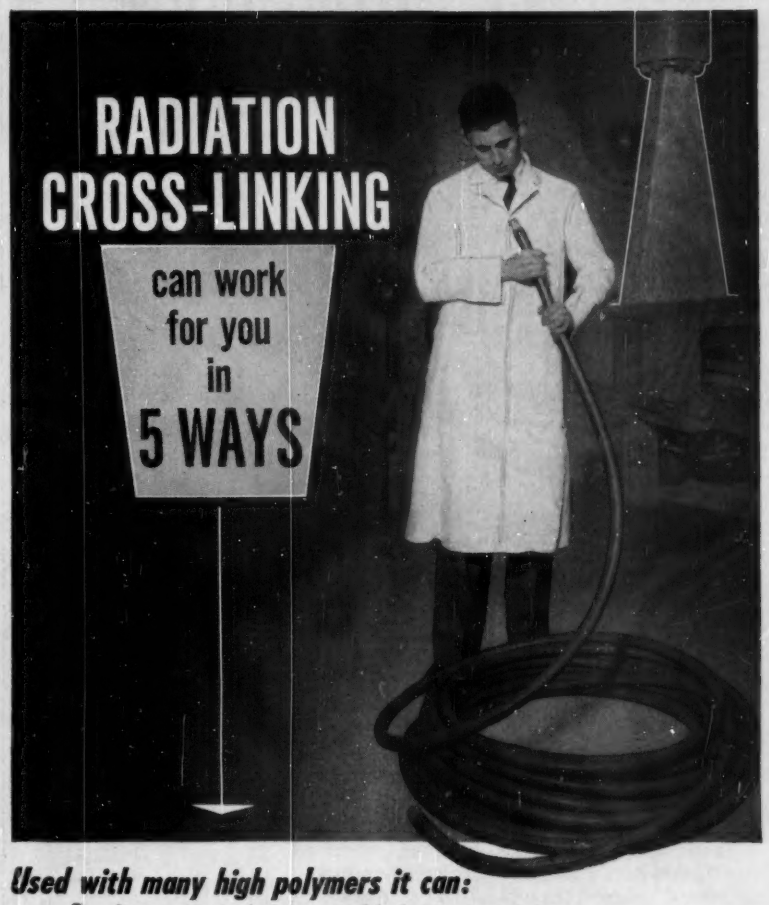
FDA'S LARRICK: To manufacturers, a bow for prompt, voluntary action.

LEGAL

Cooperation Cited: Some manufacturers of drugs and other chemical specialties were lauded recently by Commissioner George Larrick of U.S. Food & Drug Administration for their prompt action to protect the public

Advances in Applied Radiation

DEVELOPMENTS in APPLIED RADIATION ENERGY, its APPLICATIONS and the APPARATUS USED TO PRODUCE IT



Used with many high polymers it can:

1. *Increase resistance to high temperatures*
2. *Improve electrical characteristics*
3. *Improve mechanical properties*
4. *Increase resistance to acids*
5. *Increase resistance to solvents*

In the production of electric cables, for instance, cross-linking by radiation can make substantial contributions to the performance characteristics of polyethylene insulation — increasing its ability to withstand heat, while retaining the excellent electrical properties of the insulating material. Van de Graaff particle accelerators made by HIGH VOLTAGE are being used by leading cable companies in the United States and in Great Britain, to furnish the high electron beam outputs and penetration necessary for treating thick coverings of insulation.

Have you ever wondered what radiation energy might do for you?
No matter how remote from nuclear physics your product or process seems, applied radiation may reveal profitable answers to questions no one ever asked. Our specialty is helping you find both the questions and the answers. Write or phone for details of this service.

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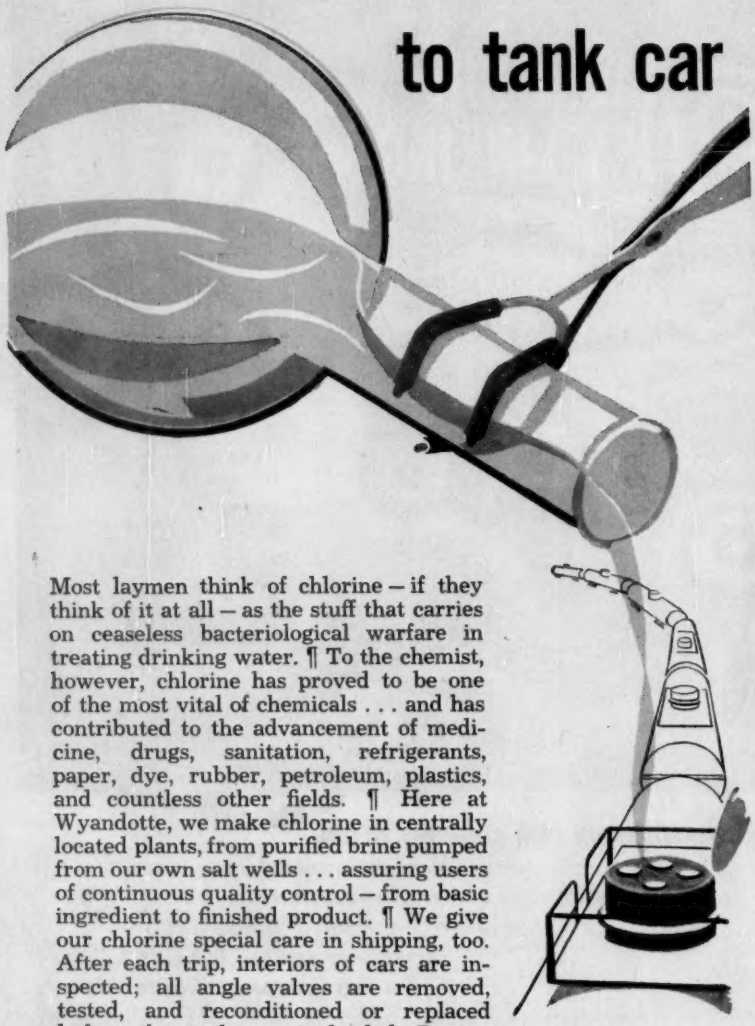
We pamper our chlorine from brine to tank car



Most laymen think of chlorine – if they think of it at all – as the stuff that carries on ceaseless bacteriological warfare in treating drinking water. ¶ To the chemist, however, chlorine has proved to be one of the most vital of chemicals . . . and has contributed to the advancement of medicine, drugs, sanitation, refrigerants, paper, dye, rubber, petroleum, plastics, and countless other fields. ¶ Here at Wyandotte, we make chlorine in centrally located plants, from purified brine pumped from our own salt wells . . . assuring users of continuous quality control – from basic ingredient to finished product. ¶ We give our chlorine special care in shipping, too. After each trip, interiors of cars are inspected; all angle valves are removed, tested, and reconditioned or replaced before the tank car is loaded. During loading, the contents are sampled and analyzed. Cars are held for 24 hours . . . then there's a final test before release. ¶ Are you looking for a reliable source for chlorine? We'd like to serve you. Contact . . . *Wyandotte Chemicals Corporation, Technical Inquiry Section, Wyandotte, Mich. Offices in principal cities.*

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MURIATIC ACID • CALCIUM CARBONATE • CALCIUM CHLORIDE
GLYCOLS • CHLORINATED SOLVENTS • SYNTHETIC DETERGENTS
OTHER ORGANIC AND INORGANIC CHEMICALS

by removing defective lots from the market. Among these were vitamin and antibiotic products whose potency had deteriorated, an antihistamine product mislabeled as to potency, and a drain cleaner not labeled to comply with the caustic poisons act.

But Larrick also reports two new criminal actions under the food and drug laws. In one suit, the makers and distributors of a food preservative were fined a total of $1,125 plus $42.60 court costs because their product contained sodium bisulfite but was labeled as containing sodium benzoate or monosodium phosphate, citric acid, sodium bicarbonate and ascorbic acid. In the other, a $2,500 fine was levied against a company whose animal feed fortifier did not contain the declared amount of vitamin D_3.

•

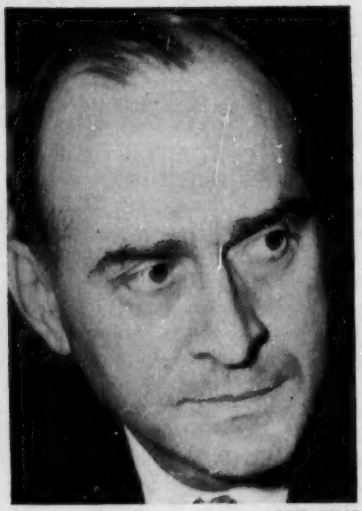
Price-Fixing Charged: In a case that may help to resolve conflicting interpretations of federal pricing laws, a federal grand jury at Boston has returned antitrust indictments against Socony Mobil Oil Co. and its New England divisional manager, B. Reginald Potts. The Justice Dept. is accusing Socony of illegal price-fixing through oral agreements with distributors on resale prices, and Potts is charged with approving such acts. Both the company and the individual deny these charges, state that all they did was to lower prices to local dealers to enable them to compete.

LABOR

Long Strike Settled: The walkout by International Union of Operating Engineers (AFL-CIO) at the Lion Oil refinery in El Dorado, Ark., ended after 97 days—two days longer than the strike against Lion's chemical plant in that city several years ago. The settlement was generally along the lines of the 25¢ offer made by the company in April, except that the entire increase goes into effect within 90 days instead of within six months.

•

Automation Anxiety: Delegates to the recent conference of the International Labor Organization in Geneva, Switzerland, recognize that automation is "an effective means of providing expanding national economies and higher standards of living"; and they even expect that—in the long run, at least—it will lead to more jobs.



WIDE WORLD

ILO'S MORSE: To nations and industries, a plea to bar 'dislocations.'

But they're worried about possible short-term effects. They've asked ILO Director-General David Morse to work for concerted action by nations and industries "to avoid or hold to a minimum the social dislocations and human costs" that may be involved. Government, employer and labor delegates from more than 70 member nations attended the sessions.

•

Enduring Contracts: The trend toward long-term labor contracts is a substantial one, the National Industrial Conference Board finds. While a 1948 survey of 313 agreements showed only 24.6% running for more than one year, a 1950 study of 303 contracts revealed 46.4%; and this year, a perusal of 923 wage pacts shows that 56.0% have a duration of more than one year. Among current agreements, 10.5% run for more than one year but less than two; 21.7% are two-year agreements; 6.8% have a term of more than two but less than three years; and 14.4% have a three-year life. Over the past year, an increasing number of chemical companies have been experimenting with longer-lasting contracts.

•

Two-Purpose Strike: Two aims are reportedly behind the strike by hourly paid employees at the explosives plant of Canadian Industries Ltd. (1954) at Nobel, Ont.: first, to gain a substantial wage boost—preferably, the 15¢/hour increase demanded; and secondly, to

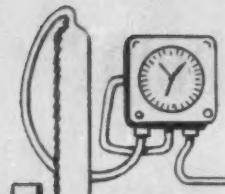
Need technical help?

Drop us a line

Although we are primarily concerned with converting limestone, salt, coal, and petroleum derivatives into basic chemicals of highest commercial purity, one of our major enterprises is helping customers use our products to the best advantage. ¶ To do this – and to keep apace of the ever-changing needs of industry – we maintain one of the most modern research centers in the business. We also have one of the finest technical-service departments in the business – staffed by skilled personnel with long experience in applications of Wyandotte's chemicals, and with a broad knowledge of the proper equipment for the correct handling of those chemicals. ¶ Whether you are a Wyandotte customer, or a prospective customer, our complete facilities are at your disposal. If you have a product or processing problem, send us as many details as possible. We'll be happy to lend assistance in every way we can. *Wyandotte Chemicals Corporation, Technical Inquiry Section, Wyandotte, Mich. Offices in principal cities.*

Wyandotte CHEMICALS

HEADQUARTERS FOR ALKALIES



Your fact file on INDOPOL polybutenes

Types of products in which INDOPOL Polybutenes are presently being used.

Calking compounds	Special lubricants
Sealants	Drawing compounds
Adhesives	Surgical tapes
Mastic cements	Coated papers
Gaskets	Electrical insulations

Product and production benefits obtainable with INDOPOL Polybutenes.

Lower raw material costs.
Reduced manufacturing costs.
Finished products with unique properties.

INDOPOL Polybutenes characteristics

High molecular weight
Yield non-volatile, non-migrating, non-shrinking products.

Inertness
Give stable, non-drying, permanently flexible products.

Light color
Suitable for use in white compounds.

Good color stability
Do not discolor in finished product.

High tack
Contribute adhesion and cohesion.

Uniformity
Help maintain uniformity and quality of finished products.

Moisture resistance
Contribute moisture-proof and vapor-resistant characteristics.

Compatibility
Are compatible with many solvents, resins, gums, rubbers, waxes and asphalts.

High Viscosity Index
Relatively little change of viscosity with temperature.

Good lubricants
Similar to high grade non-additive petroleum oils at low and intermediate temperatures.

Non-carbonizing
Depolymerize to gaseous products at high temperatures, leaving no residue.

INDOPOL Polybutene properties

Synthetic polymeric compounds.
Chemically inert.
Pale amber liquids.

Viscosity grades

Grade	Typical Viscosity, SSU at 100° F.	210° F.
L-10	114	41.0
L-50	516	66.0
L-100	1,040	94.0
H-35	7,900	375
H-50	14,000	540
H-100	44,000	1,000
H-300	140,000	3,000
H-1500	...	15,300

AVAILABILITY
Drums or tank cars. Immediate delivery from Wood River, Illinois; also LTL drum delivery from warehouses in Chicago, St. Louis, Detroit, Cleveland, Newark and Boston.

INDOIL CHEMICAL PRODUCTS

INFORMATION
Write for INDOPOL Bulletin.

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ADMINISTRATION

demonstrate to the workers that they should string along with District 50, United Mine Workers, and not flirt with Oil, Chemical & Atomic Workers (affiliated with AFL-CIO in the U.S. and with Canadian Labor Congress north of the border).

•

Two-Plant Bargaining: After recently concluding simultaneous agreements at three plants of Olin Mathieson's Squibb Division, OCAW has now negotiated contracts at two Olin Mathieson chemical plants at Niagara Falls, N.Y. These pacts—covering plant and laboratory workers—provide for a 12¢/hour general wage increase and 3¢/hour in other benefits.

KEY CHANGES

C. F. Bingham, W. E. Phillips and **H. B. Brown,** to directors, Columbia-Southern Chemical Corp. (Pittsburgh).

Augustus C. Long, to chairman and chief executive officer; and **James W. Foley,** to president, The Texas Co. (New York).

Fred A. Jolles, Herbert R. Helbig, George C. Sweet and **Sam Gurley, Jr.,** to vice-presidents, Reichhold Chemicals, Inc. (White Plains, N.Y.).

E. R. Hall, to general manager; and **H. B. Cummings,** to vice-president and assistant general manager, Metal Products Division, Koppers Co., Inc. (Pittsburgh).

Paul Mayfield, to vice-president and member of the executive committee, Hercules Powder Co. (Wilmington, Del.).

Carl Pacifico, to vice-president, American Alcolac Corp. (Baltimore).

George B. Moran, to vice-president, Freeport Sulphur Co. (New York).

Bruce K. Brown, to president, Petroleum Chemicals, Inc. (New York).

Albert B. Bower, to president, Northern Industrial Chemical Co. (South Boston, Mass.).

William A. W. Krebs, Jr., to vice-president, Arthur D. Little, Inc. (Cambridge, Mass.).

Daniel S. Dinsmoor and **Joseph C. Schumacher,** to vice-presidents, American Potash & Chemical Corp. (Los Angeles).

Whether your problem is removing dirt, dust, soot or fly ash, cleaning gas for re-use or air for recirculation, reclaiming valuable materials—Koppers Engineers can make unbiased recommendations for you. Why? Because Koppers makes all three basic types of industrial gas cleaning equipment.

KOPPERS

Makes Everything You Need to Solve Industrial Gas Cleaning Problems!

There's a Koppers unit to solve *your* air pollution problem. It doesn't make any difference how small or how big your plant is. The type of industry in which you're engaged poses no difficulty. The amount of your industrially entrained material, and its particle size, present no obstacles.

Why? Because there are three basic types of industrial gas cleaning equipment which . . . among them . . . solve industrial air pollution problems. And Koppers makes the *three* basic types! But Koppers goes way beyond merely providing equipment. Koppers engineers study and analyze your individual air pollution problem. They consider the gas and dust volume, particle size and type of your industrially entrained material.

Then, because Koppers makes a complete line of equipment, our engineers can recommend *whatever* equipment best suits your needs. Koppers engineers wear no "blinders" . . . are not limited in their recommendations. Our complete engineering service, combined with a complete line of equipment, is your best assurance of a practical, efficient solution to your air pollution problem . . . whatever it is.

For more information, write to KOPPERS COMPANY, INC., Industrial Gas Cleaning Dept., 4707 Scott Street, Baltimore 3, Maryland.

Whatever you need, Koppers makes it!

Koppers Electrostatic Precipitator. Custom-designed to eliminate "stack nuisance" . . . remove fly ash, acid mist, soot . . . recover high value materials . . . clean and purify for re-use.

Koppers New Cyclonic Type Dust Collector. Produced after years of intensive study and experience, Koppers Mechanical Dust Collector provides maximum efficiency in mechanical dust removal.

Koppers Aeroturn Dust Collectors. Automatic pressure control and reverse-air-jet action provide high, continuous filtering. Koppers Aeroturn cleans air . . . reclaims valuable materials. Felt-type filters are more efficient and longer-lasting than other filters.

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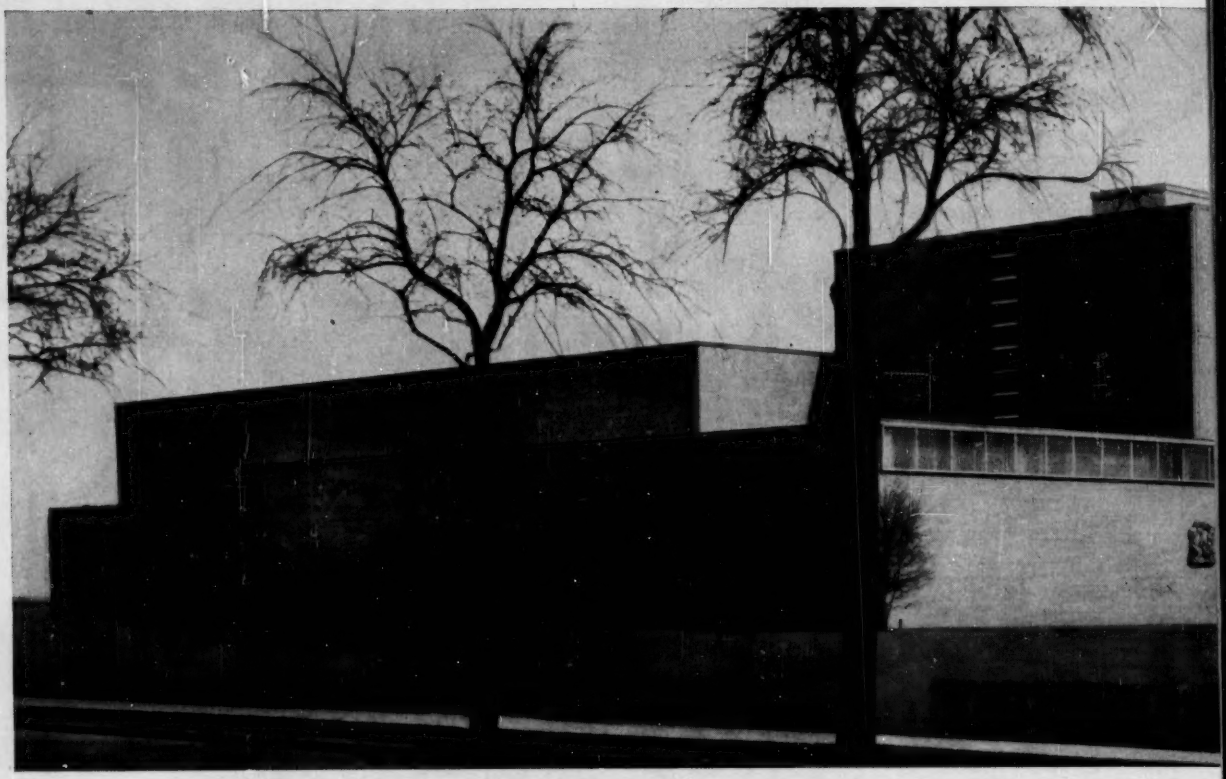
INDUSTRIAL GAS CLEANING EQUIPMENT

Koppers Company, Inc., Metal Products Division
Industrial Gas Cleaning Department

Engineered **Products Sold with** ***Service***



This is CONTINENTAL'S new

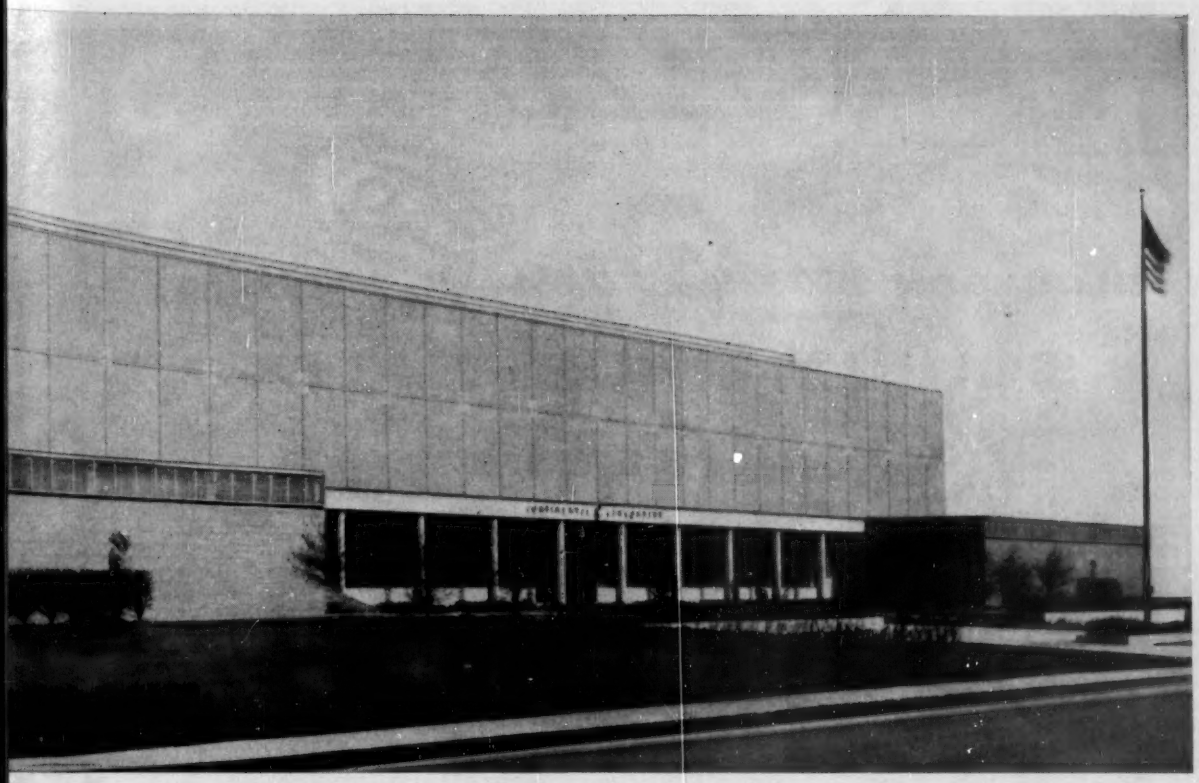
dedicated to the production of

The product of the handsome building pictured here will be more rapid improvement of cans and packaging methods, for the immediate benefit of Continental customers.

This is the new multi-million-dollar research and development center of Continental's Metal Division, located in Chicago. It brings together under one roof 265 creative-minded scientists and engineers. With as many more technicians and assistants, they function as a closely knit team—in developing better materials, processes and machines—and in taking a fresh, new look at package design.

At their disposal are the most modern chemical, physical and engineering laboratories. Also contained in the 260,000 square feet of the center are complete pilot-plant facilities for checking out any individual proposal against considerations of cost, adaptability to present equipment, and good production practices.

Backing up the new center are other Metal Division laboratories at New York and Hayward, Calif., the Central Research and Development Division facilities in Chicago, which handle long-range experimental work, and 18 field laboratories across the nation.



research and development center

better cans and packaging methods

To our friends in the
CHEMICAL INDUSTRY...
our doors and facilities are always open to you

New developments in chemical containers will come from Continental faster than ever, now that our new Metal Division research and development center is working for you. Expect more ideas like our Perma-Lining for steel containers—hot sprayed and baked in the finished container to cover every square inch of inside surface . . . also our liquid detergent cans—12-, 22- and 32-oz. with dripless ½-in. polyethylene nozzle, and 16- and 32-oz. with ¾-in. nozzle.

CONTINENTAL CAN COMPANY

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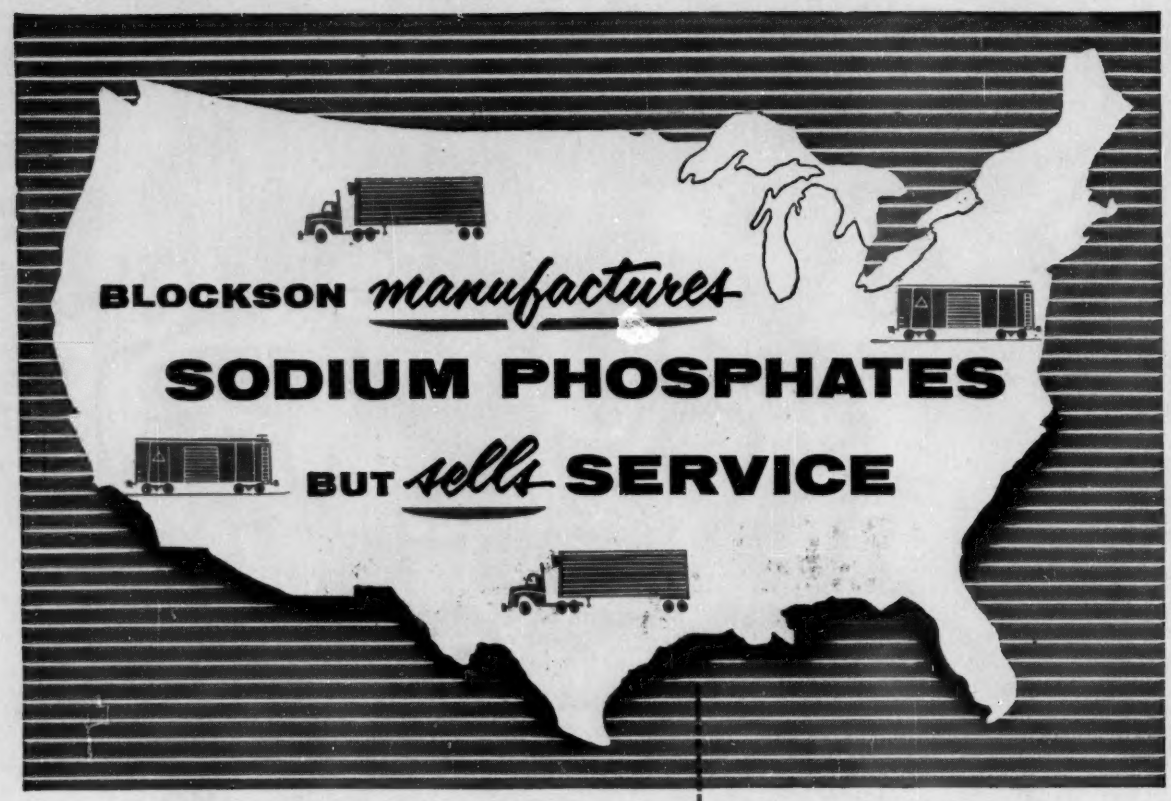
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4



THERE is a reason for the very substantial tonnage of sodium phosphates Blockson ships to industrial areas far from our greatly expanded plant facilities here in Joliet. That reason is continuous prompt shipment—a few bags or many carloads—minus the red tape usually associated with an operation as large as ours.

Again and again customers tell us they couldn't get better service if our plant were located in their own industrial community.

There is a reason for that, too. At Blockson, production and sales are so closely coordinated that a single collect phone call is all that is required to expedite your unforeseen needs and get your sodium phosphates en route the very same day if it is humanly possible, and most frequently it is.

We welcome the responsibility of functioning as an arm of our customers' production setup, minimizing their inventory and warehousing expense, timing and dovetailing dependable shipments with their own processing operations and at all times providing a uniform and dependable competitively priced product—readily available in your required granulations and specifications.

The new Blockson catalog and handbook is yours for the asking.

BLOCKSON CHEMICAL COMPANY
Division of Olin Mathieson Chemical Corporation
Joliet, Illinois

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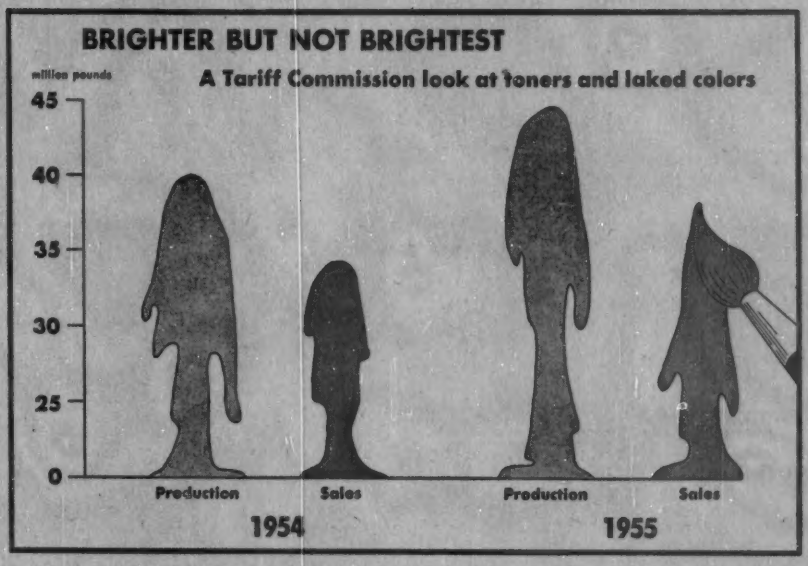
- *Trisodium Phosphate*
  CRYSTALLINE • MONOHYDRATE
- *Tetrasodium Pyrophosphate*
  ANHYDROUS
- *Sodium Polyphos*
  (SODIUM HEXAMETAPHOSPHATE)
  (SODIUM TETRAPHOSPHATE)
- *Sodium Acid Pyrophosphate*
- *Trisodium Phosphate Chlorinated*
- *Disodium Phosphate*
  ANHYDROUS • CRYSTALLINE
- *Monosodium Phosphate*
  ANHYDROUS • MONOHYDRATE

- *Sulfuric Acid*
- *Sodium Fluoride*
- *Sodium Silicofluoride*
- *Hygrade Fertilizer*
- *Teox® 120*
  NONIONIC SURFACTANT

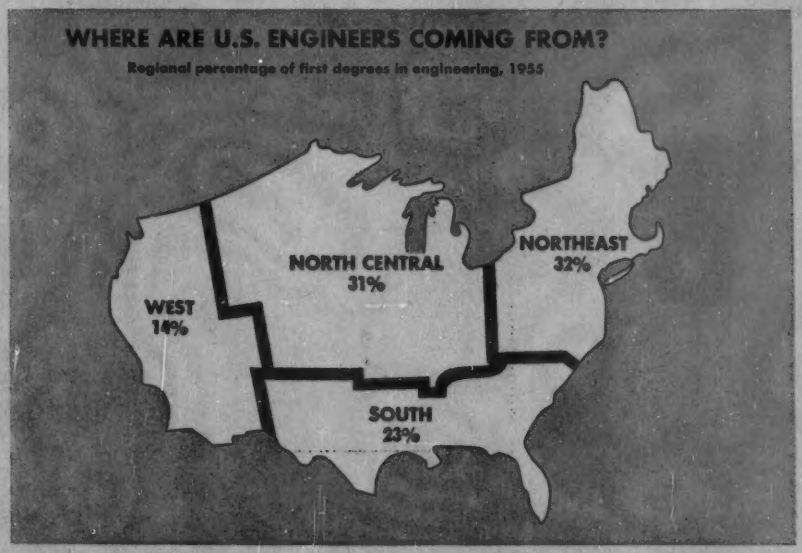
BLOCKSON

Charting Business

CHEMICAL WEEK
July 14, 1956



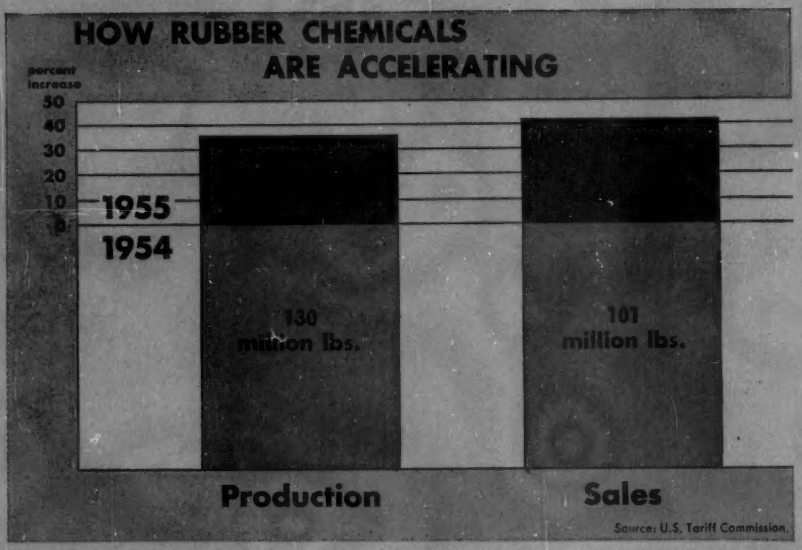
TONNAGES of synthetic organic toners and lakes (color pigments used mainly in paints, inks, plastics, and for textile printing) in 1955 were the highest since the peak years 1950 and 1951. Then, U.S. output of these chemicals soared to over 47 million lbs. In 1954, production dropped to 40 million lbs. from 44 million in '53. Last year, the industry regained vigor, sparked production 11.3% higher; dollar values shifted 19.3% higher. One significant point: U.S. pigment manufacture is increasing more rapidly than dye output.



IF INDUSTRY, government and education forces wage a successful technical-manpower drive, the number of students graduating with first degrees in science and engineering could increase 100% by 1965 (57,000 science graduates in 1955, compared with an estimated 113,000 in 1965). By then, population changes may shift the regional pattern of technical-manpower supply. Now schools in Northeastern and North Central states account for 63% of our new science and engineering graduates, 75% of our science and engineering doctorates.

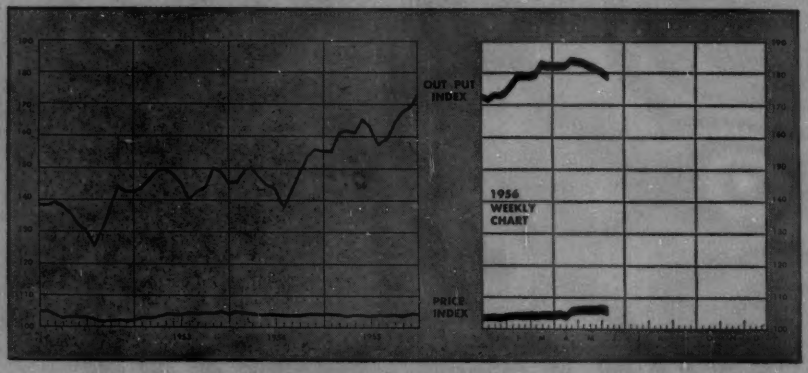
Charting Business

(Continued)



ALONGSIDE scores of records set by industry in 1955, two more should be chalked up for chemicals. Synthetic elastomer production jumped 58% over '54, reached a record 1,435 million lbs. In pace with this hike, rubber processing chemicals bounded to 177 million lbs., 36% over '54. Rubber chemical dollar sales were up accordingly ($86 million vs. $62 million). Accelerators led other rubber chemicals by accounting for 46.1% of total production; anti-oxidants were in second place at 42.7%; peptizers, stabilizers and conditioners hit 11.2%.

BUSINESS INDICATORS



WEEKLY

	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947-49=100)	175.9	176.6	161.2
Chemical Week Wholesale Price Index (1947=100)	105.3	105.3	104.3
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	487.0	482.2	494.5

MONTHLY

Foreign Trade (million dollars)	Exports			Imports		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
Chemicals, total	104.8	112.6	99.3	26.6	27.1	22.4
Coal-tar products	5.5	5.9	6.0	5.3	4.8	3.5
Industrial chemicals	15.2	18.0	13.1	7.2	7.7	5.7

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$$\begin{array}{l} HCCOOH \\ \| \\ HOOCCH \end{array}$$

Made in our new Moundsville, W. Va. plant by an exclusive direct catalytic-oxidation process developed by National Aniline Research, National FUMARIC ACID provides the ideal combination of chemical and physical properties for better polyesters, ink resins, alkyds, drying oils, plasticizers and pharmaceuticals.

Chemically, National Fumaric Acid is 99.6% pure with ash 0.02 maximum. Physically, it is pure white, free-flowing (100% thru 20 mesh) and practically dust-free (5% maximum thru 100 mesh). In every respect, it is a consistently high-quality product.

For customer convenience and economy, we now offer mixed carload or mixed truckload shipments of National Fumaric Acid with Maleic Anhydride, Phthalic Anhydride and Adipic Acid from plant stocks at Moundsville, W. Va. and Buffalo, N. Y. We will be pleased to quote and send samples for work that may lead to greater use of these chemicals.

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Allied Chemical

ATLAS

CHEMICALS DIVISION
ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE • ATLAS POWDER COMPANY, CANADA, LTD., BRANTFORD, ONTARIO, CANADA

Why SORBO® *is your best humectant buy*

For use in cosmetic creams and lotions, toothpaste, candies, pharmaceuticals, glue specialties, tobacco, and other moisture-sensitive products, SORBO leads all other humectants (moisture-conditioners) in effectiveness and economy.

If you use a humectant—get to know SORBO. It's a 70% solution of high purity sorbitol (hexahydric alcohol or *polyol.*) Atlas makes this material by the tens of millions of pounds yearly, by hydrogenation of refined sugars. Several hundred manufacturers use it for moisture conditioning . . . in many different kinds of products. Here are some of the reasons for its popularity.

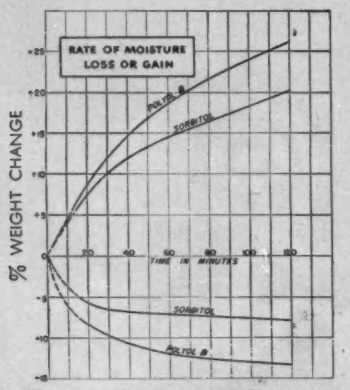


Figure 1—*Showing rates of moisture loss (lower portion) when sorbitol and a competitive more expensive humectant are transferred from 58% relative humidity to 32% and rate of gain (upper portion) when both are transferred from 58% to 79% R.H.*

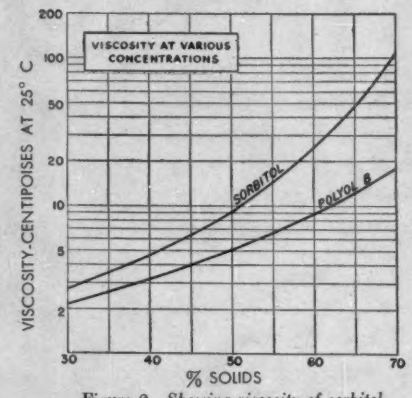


Figure 2—*Showing viscosity of sorbitol solutions compared with solutions of another widely used (and much more expensive) humectant-polyol. Note that sorbitol has a higher viscosity at the same concentrations in water.*

Lower rate of moisture change

Products conditioned with SORBO lose moisture at a slower rate in dry atmospheres . . . gain moisture at a slower rate in high humidity. This characteristic is shown in the accompanying graph (Fig. 1). Note that, on the lower portion of the graph, sorbitol solutions lose only about half as much moisture in two hour's "drying out" as the other widely used polyol solution. The upper part of the graph shows moisture gain when conditioner solutions are exposed to high humidity. Here, too, sorbitol resists moisture change better . . . preventing the product from becoming excessively soft or soggy in damp weather.

High viscosity

Sorbitol solutions are inherently more viscous than solutions of other polyols, as shown in Figure 2. In contrast to some conditioners which thin out excessively because of moisture pick-up in damp weather, sorbitol not only picks up less water but also retains a comparatively high viscosity. Moreover, its high viscosity means lower-cost "bodying" action for various liquid cosmetics and pharmaceuticals

Non-volatile

Sorbitol does not evaporate. This permanent nature of sorbitol is particularly valuable in conditioning products having high ratio of surface to volume, such as adhesives, gaskets, cellulose products, paper and tobacco.

Plentiful . . . low in cost

What makes SORBO especially attractive to cost-conscious buyers is its consistently low price. In spite of periods of inflation and general tight supply of other materials, the price of SORBO has never gone in any direction but downward. Moreover, by contrast with other polyols, SORBO is practically shortage-proof —it is derived from a plentiful agricultural raw material . . . and manufacturing facilities can be easily expanded. We'll be glad to send you a copy of the booklet, "Atlas Sorbitol and Related Polyols," and samples of SORBO for your own testing. We can also give you valuable help in recommending ways to incorporate SORBO in your specific product.

chem-memos

ATMUL® Emulsifiers

improve baking qualities of shortening

Manufacturers of modern emulsified shortenings are finding a lot to interest them in ATMUL food emulsifiers.

Probably the most appealing feature of ATMUL emulsifiers is their built-in "tolerance." Shortenings that contain ATMUL make cakes with higher volume and fine-textured grain. For icings, ATMUL shortenings produce high water absorption, and high volume. And best of all, the shortenings are not what bakers call "critical." They always give the same excellent results, under the variations that normally occur in bake shop procedures.

The reason behind this "tolerance" is the optimum balance of mono- and diglycerides in ATMUL products and the high uniformity standards to which they are manufactured. You can rely on them to meet *all* specifications . . . on every drum, on every shipment. They're your best bet for consistent performance, either in "high ratio" bakers' shortenings for cakes and icings, or in cake shortenings sold direct to the consumer. Furthermore, they cost *less* per 100 pounds of shortening.

Write to Atlas today for technical data on ATMUL food emulsifiers, samples for test, and recommendations for usage in your specific product.

How to save labor in purification processes using activated carbon

When you are purifying a solution by means of adsorption with activated carbon, one of the principal labor costs is at the filter station. Usual practice is to add carbon to the solution, then filter out the carbon. The filter, however, has a definite volumetric capacity. After it has accumulated a certain number of cubic feet of carbon, it has to be emptied.

Darco® activated carbon, with its high bulk density, lengthens filter cycles and cuts down the amount of labor at the filter station, and Darco weighs almost twice as much per cubic foot as some light, fluffy grades of activated carbon. Thus, you can get nearly twice as many pounds of Darco in a given filter. Since dosage of carbon is calculated on the basis of weight per gallon of liquid, Darco lets you process nearly twice as much solution per filter cycle.

This is only one of the qualities that make Darco an efficient, economical way to purify many different products. Ask us to send you the complete Darco story . . . and call us for assistance with your purification problems.

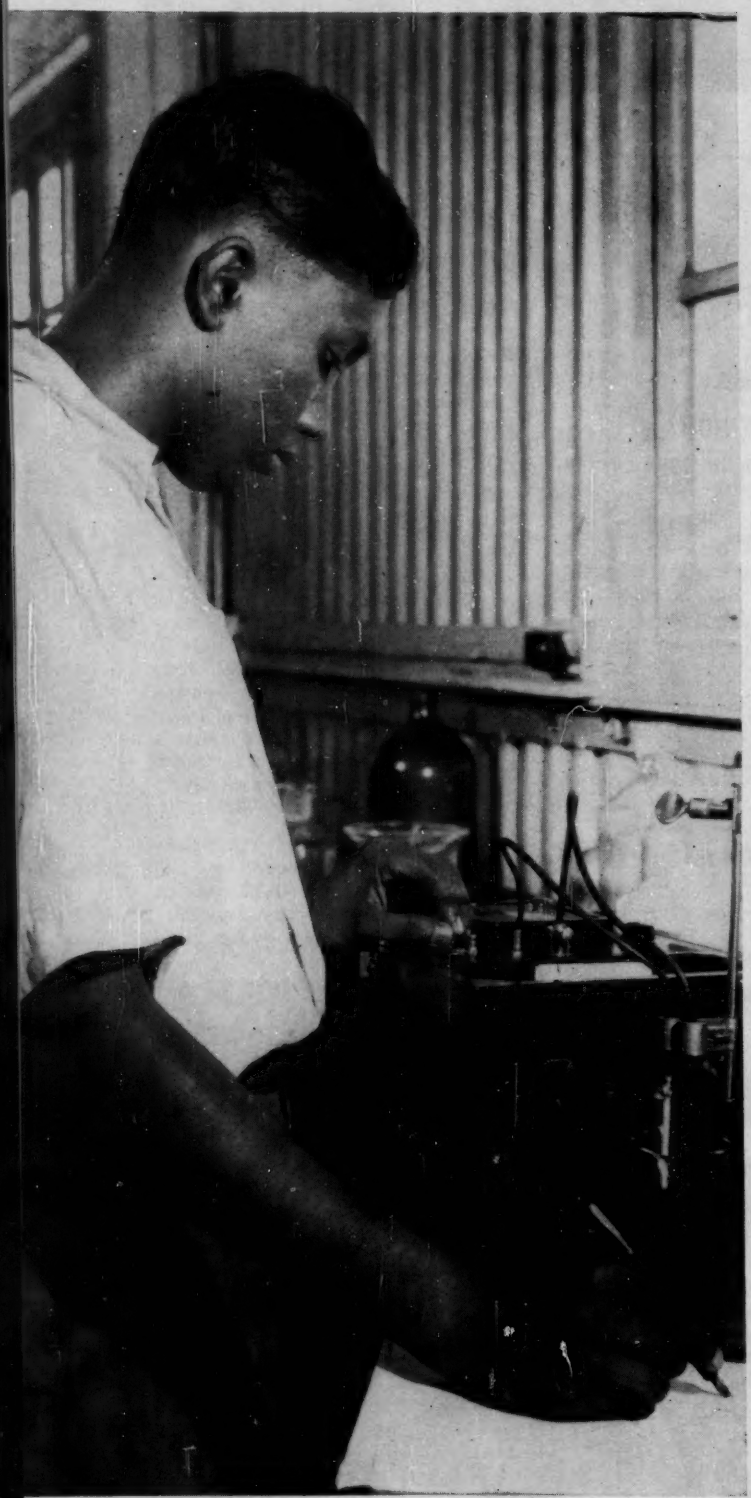
Silicone Furniture Polishes Made with ATLAS EMULSIFIERS

A recent development in the manufacture of polishes is the incorporation of the new silicones into various types of polish formulation, for increased repellency toward liquids and dust. The Silicone Products Department of General Electric Company, which has done much pioneering work in commercial applications of silicones, recently published the following formula for a cream type furniture polish:

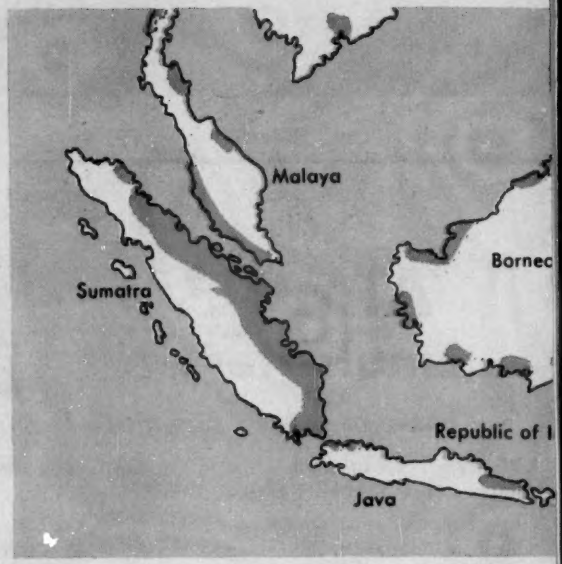
	Parts
SF-96-300 Silicone Fluid*	4.0
Carnauba wax	1.0
Cardis 319 wax	1.5
Paraffin wax	2.5
Mineral Spirits	20.0
SPAN® 60	1.5
TWEEN® 60	1.5
Sodium CMC	0.3
Water	67.7

*General Electric Company

In this formula, our SPAN 60 (sorbitan monostearate) and TWEEN 60 (polyoxyethylene sorbitan monostearate) are used as emulsifiers to obtain a stable dispersion of the ingredients in water. Several Atlas emulsifiers have been adapted for use with the silicones, not only in polishes, but also in protective creams. Write us for assistance on your new formulations involving silicone emulsions.

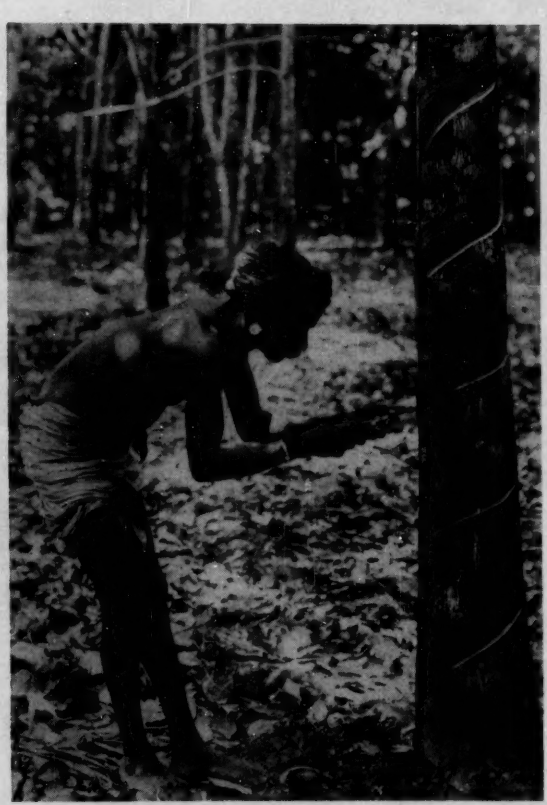


IN THE LAB: Push for better products.



COLORED AREAS spot plantations in

Natural Rubber's



IN THE FIELD: Strides toward better yields.

he Far East where research is opening . . .

New Frontier

NATURAL RUBBER producers are finally beginning to move—though slowly—to ward off further encroachments by synthetics.* Through research, they hope to win uncommitted markets (where the two materials are in a technological stalemate)—perhaps even to win back part of the market already captured by synthetics.

To illustrate the inroads made by synthetics: U.S. rubber consumption figures show that the synthetics jumped from 620,000 tons in 1954 to 890,000 tons (limit of plant capacity in 1955); in the same period, natural had a scant rise from 600,000 tons to 632,000 tons.

Price is another indicator of the sharpening competition. Crude now sells for about 31½¢/lb.; synthetic goes for 23¢/lb. As recently as last December, natural was 52¢/lb., 29¢ higher than the synthetic product.

Seeking to fight back by means of more research are the world's six natural rubber research labs (which fall into three main camps—British Malaya; Dutch Indonesia; French Indo China). Object: find new uses for natural rubber, develop new process for chemically tailoring the natural product to new uses, improve yields of rubber by improving agricultural methods.

And in the offing, among other things, are:

- An increase in the assessment on Malayan rubber exports (currently one-sixth of one U.S. cent per pound) to finance an expanded research program, geared more than ever to applied research.
- Establishment of a technical liaison staff in the U.S. These technicians would be paid by the British, Dutch and French natural rubber industry, make the rounds on a full-time, permanent basis of U.S. rubber-consuming plants. Their twofold purpose: (1) to inform U.S. industry of new research developments in natural rubber, e.g., new products and processes coming out of the six labs in Europe and Asia; (2) to keep their own labs posted on the needs of U.S. firms, bring back projects for the labs to work on (customer research).

One at Work: Spearheading natural-rubber research is the British Rubber Producers' Research Assn. For natural rubber to protect its position, BRPRA's representative, L. C. Bateman, says: "Many new approaches are necessary —not only from the technological standpoint of basic research, but also as an entirely new approach for promotion of its products and a constant eye to new uses for natural rubber."

With this goal in mind, BRPRA is exploiting all possibilities. Bateman says: "To date we've not come up with any achievements that could be considered revolutionary, but we are doing long-term fundamental research to provide a basis for new and unknown technical advances."

This is what BRPRA has been working on:

- Various types of modified rubbers that can be used in applications still unknown to the rubber field. For example, new graft polymers that contain up to 50% polymethyl methacrylate, feature added toughness while retaining high tensile strength.

These new polymers are potentially useful as reinforcing resins for natural rubber, with which they're readily compatible.

Another modified rubber—"superior processing rubber"—is partly vulcanized latex mixed with unvulcanized latex and made into crepe. One major tire firm took a 10-lb. sample of the material for evaluation, then proceeded to order an additional ton to experiment with.

The product is said to have advantages over ordinary sheet and crepe in the intermediate stages of converting raw rubber into the manufactured article. Thus, it can be more easily brought into the necessary smooth condition for the preliminary shaping of the article, and it retains its shape much better than any other type of rubber through subsequent processing.

Another example is a rubber latex that can be combined with portland cement. This is a new development. The U.S. Bureau of Public Roads is now testing the cement-latex combination as a simple method of waterproofing structural concrete.

- Cyclized rubber*. A number of U.S. firms are reportedly seeking experimental quantities of cyclized rubber. Among them is at least one big rubber and sole producer who wants to see whether cyclized rubber will give it a material to compete with Neolite (which Goodyear has exclusively under patent).

Where Do We Stand? Bateman reports that studies are at a point where BRPRA now has a better understanding of the oxidation of rubber, vulcanization, wear and abrasion and elasticity. Also, researchers are learning more about the composition of natural rubber latex as well as its behavior "from the tree through the manufacturing process."

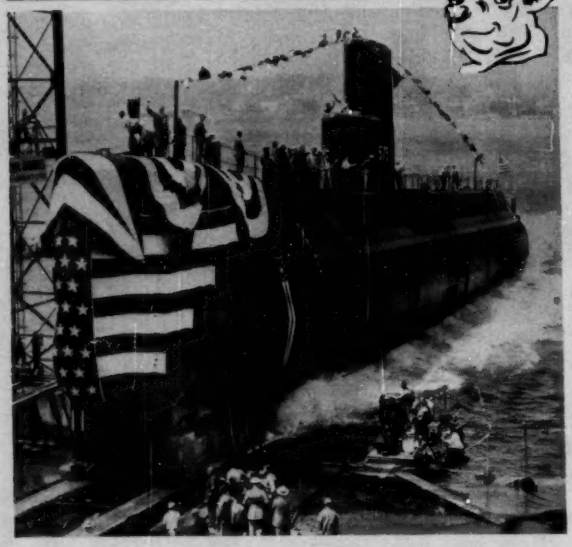
In another area, strides have been made by his group in agricultural research. This research has reportedly brought substantial improvement in yields of rubber. New methods and care in treatment of the trees now result in six to eight times as much rubber. In view of this, Bateman says: "Natural rubber producers can now produce their raw material at a lower cost than any comparable synthetic. On this score, the future looks bright."

To illustrate, some observers feel

*There's general agreement that natural and synthetic rubber each has a superiority edge for about one-third of the total market, leaving one-third as an area where—at the present stage of development—they can compete on equal terms. Right now, synthetics account for more than 60% of all new rubber consumed in the U.S.

*Cyclized rubber: long straight chains are joined together into a larger molecule that has a ring structure. Cyclized rubber is less saturated, tougher than the straight-chain rubber.

Another coating problem solved by Borden . . .



how a Borden chemical helped "launch" the atomic Seawolf

THE instant the Seawolf started her initial dive under the sea, a Borden chemical started protecting the Navy's mighty guardian of our shores from a constant enemy—corrosion in vital ballast tanks.

Here's the inside story: A submarine must flood sea water into her ballast tanks to dive . . . then blow it out in order to surface. Therefore, these tanks must be lined with a dependable coating resistant to the corrosive attack of sea water. To assure this vital protection, Borden's Resinous-Reslac Department furnished a coating that has been used for years in submarines . . . and has proved its superiority beyond question.

This submarine "protector" is but another example of Borden's creative chemistry at work in the coating field. If you have a product that may be developed or improved through use of the right resin emulsion, solution, or hot melt for adhesive bases, binders, coatings, sizes and saturants, take advantage of Borden's experience. *If time is of the essence . . . phone us and we'll have a technical representative at your plant within 48 hours.* The Borden Company, Resinous-Reslac Dept. CW-76, 103 Foster St., Peabody, Mass. In Chicago: Resinous-Reslac Dept., 3634 W. 38th St., Chicago 32, Ill. In Canada: American Resinous Chemicals of Canada Ltd., 20 Trent St., Toronto, Canada.

RESINOUS-RESLAC DEPARTMENT

THE Borden COMPANY

CHEMICAL DIVISION

BRPRA'S BATEMAN: For new advances, new approaches.

that a well-run rubber plantation can sell rubber at 15¢/lb. They look forward to an eventual price of 10¢/lb.—and still expect to make money.

However, because natural rubber is sold on the commodity market, speculation, not the law of supply and demand, dictates price. For this reason, it's difficult to say whether the price of the processed product will drop, even if the price of the raw rubber declines.

How It All Works: Loosely coordinating the research efforts of the six laboratories—actually acting as a clearing house, but exercising no directive powers—is the International Rubber Research Board (London). All six labs work in close harmony and toward the same end—helping the natural rubber producing industry.

The British Malaya setup exemplifies the close tie-up of Asian-European research efforts. The source of power is in the Malayan rubber producers' council. The council is composed of eight Malayans (representing medium and small holder producers) and seven non-Asians representing the European, British and American estate producers. (The British-owned estates predominate, but Malaya also has the French Socfin interests and one of America's U. S. Rubber Co. plantations.) The council levies a tax on exports (⅛¢/lb.), has the sole power to spend the money—which in 1955 came to about $2.3 million.

It uses the money to support three

Neville Announces Nevastain A

A New Non-Staining Rubber Antioxidant with Superior Characteristics

Nevastain A is an excellent non-staining, non-discoloring antioxidant with very low volatility and good stability. Synthetic and natural rubber compounds using Nevastain A have superior physical characteristics over those containing competitive non-staining antioxidants. Among its virtues are that it does not retard vulcanization, does not have an accelerating effect and does not bloom uncured or cured stock when used in normal quantities. This new product is being produced on a plant scale and is readily available and attractively priced. Use the coupon below to write for Technical Service Report No. 45.

Neville Chemical Company, Pittsburgh 25, Pa.

Resins—Coumarone-Indene, Heat Reactive, Phenol Modified Coumarone-Indene, Petroleum, Alkylated Phenol • **Oils**—Shingle Stain, Neutral, Plasticizing, Rubber Reclaiming • **Solvents**—2-50 W Hi-Flash, Wire Enamel Thinners.

NEVILLE

Please send Technical Service Report No. 45.

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groups, and it's the sole financial support of these groups): the Rubber Producers Research Assn. (Welwyn Garden City), the Rubber Research Institute of Malaya (Kuala Lumpur) and the Natural Rubber Development Board (London).

In a Spot: Here's why natural rubber producers are in a bad competitive position today. For decades, natural rubber producers had no competition to contend with. Before the Korean War, U.S. rubber producers (accounting for half of world usage) looked mainly to natural rubber. Then the natural went sky-high. U.S. consumers, having developed know-how in use of synthetics, switched from natural.

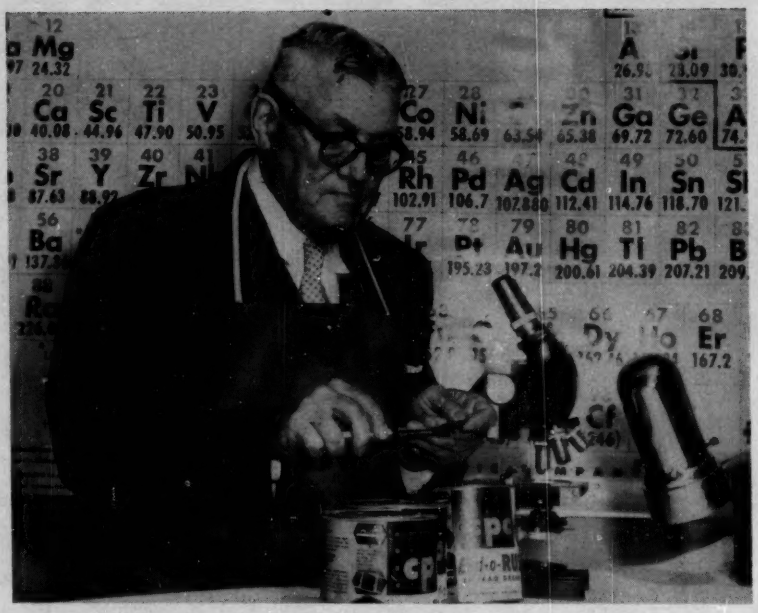
Even then, it took natural rubber producers a bit longer to accept the fact that synthetic had become a serious competitor—accept it to a point where they would be willing to recognize a need for action to woo consumers to natural rubber. That's where the producers stand now, ready to draw up an action plan to make natural rubber more competitive with synthetics.

Convinced: How well the natural will fare against the test tube product is hard to say. Natural rubber scientists are convinced they've got a superior product, and need only to exploit it by doing the research that will bring out natural's inherent advantages.

On the other hand, some chemists here feel that these efforts may at best delay but won't head off the eventual complete victory of synthetics. And with the advent of "synthetic natural" rubber, some observers have gone so far as to predict the extinction of natural rubber by 1975.

Best guess is that through stepped-up research effort both natural and synthetics will be improved and become cheaper. Also, bear in mind that the same U.S. firms that make synthetics and use large quantities of rubber are also natural rubber producers (e.g., U.S. Rubber in Malaya and Sumatra, Goodyear in Sumatra, the Philippines and Brazil, Firestone in Liberia, and now Goodrich—world's largest synthetic producer—has entered the picture by starting up in Liberia).

As Bateman sees it, "It'll be a tough struggle, but I see a bright future in store for natural rubber, even though it will have to meet an ever-increasing competitive situation."



HMPC'S HUNTER: For paintmakers, his paste pigments promise to put . . .

New Colors in the Can

If they prove out, a series of new paste pigments will be of keen interest to the paint and protective coating industries.

Called CPC paste pigments, the newcomers come in both metallic and nonmetallic form. They are reportedly nonhygroscopic, nonoxidizing, noncorrosive, nonhydrolyzing in water, mineral acids, alkalis; and they reputedly won't cake in storage, which makes them attractive for putty and caulking compounds.

Chemical Sealers, Inc. (Belleville, Ill.) makes them under an exclusive license from Hunter Metallic Products Corp. (Belleville, Ill.). HMPC's president, Samuel Hunter, developed the pigments, received patents U.S. 2,713,006 and Canadian 492,146 on them. Hunter says he hasn't decided whether additional licenses will be granted.

No Names: Although Hunter says that paint companies throughout the U.S. and Canada are experimenting on a pilot scale with his products, he declines to reveal names. None of several paintmakers — Sherwin-Williams (Cleveland), Du Pont, Benjamin Moore (New York), Pratt and Lambert (Buffalo), M. J. Merkin (New York)—checked by *CW* has heard about these products, although all admit they would be interested.

Right now, Hunter says the products are in pilot-plant production, but output will increase as demand goes up.

New Horizons: The fledglings are allegedly compatible with many compounds (e.g., lacquers, certain vinyl resins) that are incompatible with older paste pigments. This is expected to open up new fields to paste pigments.

And now such metallic pigments as copper, bronze—even elemental iron —can reportedly be put in paste form. Previously, paste pigments containing these metals could not be made because the products discolor or oxidize.

Secret Agent: Secret of the discovery is the wetting agent used to disperse the pigments. It's described as a "liquid chlorinated polyphenyl," e.g., one agent is a chlorinated biphenyl containing 54% chlorine. The wetting agent is said to lubricate, coat, polish the metallic pigment flakes, produce a pigment paste that has durability, permanence, brilliance.

Since the pastes must be tailormade for specific applications, costs vary—depending on ingredients, concentration, etc. Average range: 70¢-$3/lb.

Although this is higher than the

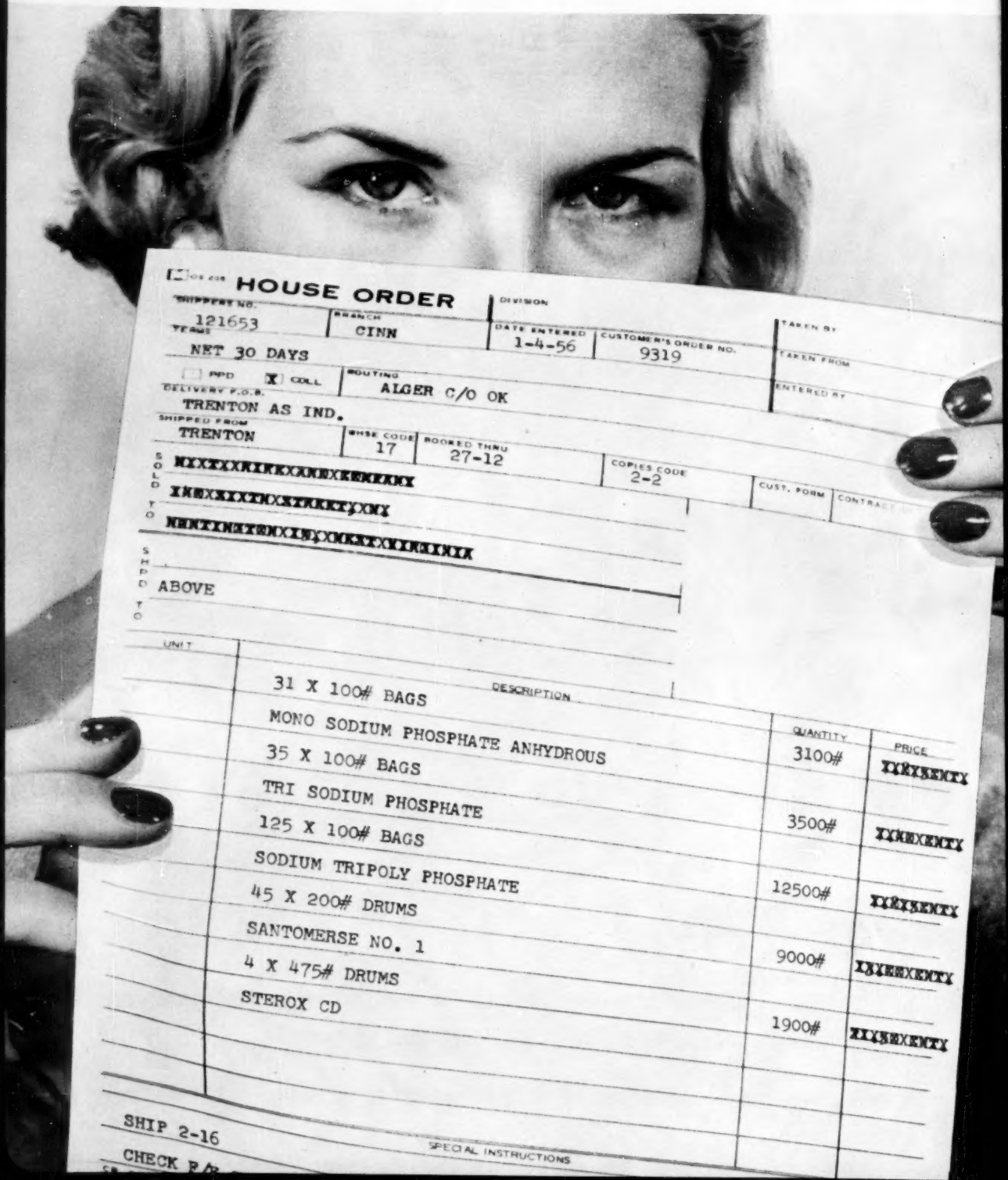
How do you order detergent chemicals...

from several sources
the hard, slow way?

from Monsanto in mixed truckloads
the quick, simple way?

Let's see what you ordered from Monsanto. You've already saved time and overhead costs—but that's only the start!

An actual mixed truckload



HOUSE ORDER

SHIPPER NO.	BRANCH	DIVISION		TAKEN BY
121653	CINN	DATE ENTERED 1-4-56	CUSTOMER'S ORDER NO. 9319	TAKEN FROM
TERMS NET 30 DAYS				
☐ PPD ☒ COLL.	ROUTING ALGER C/O OK			ENTERED BY
DELIVERY F.O.B. TRENTON AS IND.				
SHIPPED FROM TRENTON	WHSE CODE 17	BOOKED THRU 27-12	COPIES CODE 2-2	CUST. PORM / CONTRACT

SOLD TO XXXX

order filled by Monsanto

5 different chemicals — 3 sodium phosphates and 2 surface-active agents — 30,000 lbs. delivered promptly to you in one truck — underway only a few hours after Monsanto receives your order. AND LOOK AT THESE BENEFITS!

YOU BUY ONLY WHAT YOU NEED. From Monsanto you buy only the chemicals in the amounts you need, not more than you need. As in the order at left, 1,900 lbs. of Sterox*— not a truckload; 9,000 lbs. of Santomerse*— not a truckload. Your money is not tied up in inventory.

YOU SAVE WAREHOUSE SPACE. Warehouse space costs plenty per cubic foot. Wouldn't you rather store *one* truckload of chemicals instead of four or five? When you purchase in mixed truckloads, Monsanto is actually doing your warehousing for you.

YOU SAVE DOLLARS ON PAPER WORK. On the average it costs a company $4.50 to get out one purchase order. Some companies report that more orders than normal cost as much as $13.00 each. A Monsanto mixed truckload order might eliminate three or four others— saving you more than $25.00.

YOU SAVE ON FREIGHT RATES. A minor factor? Not when you total it up at the end of the year. Every order you get from Monsanto is tailor-made to your requirements. You don't pay shipping costs on orders from several sources.

YOU PROTECT YOURSELF FROM COSTLY DELAYS. With one order instead of several, with one supplier — Monsanto — instead of several, you have cut down by many times the chances for clerical errors such as lost or mis-sent orders that can interrupt your production.

YOU GET FAST, PERFECTLY TIMED DELIVERY. Production moves smoothly because your flow of supplies is perfectly coordinated. Every-thing you need arrives together because it's all shipped from a single Monsanto storage point nearest you—usually in just a few hours after your order comes in.

ONE GROUP OF PEOPLE SERVES YOU. From the Monsanto representative who may help you choose a surfactant to the warehousemen who pack your mixed load securely, you are being served efficiently by a *single* coordinated team.

...BUT THAT'S NOT ALL!

Reg. U. S. Pat. Off.

How do you order detergent chemicals...

from several sources
the hard, slow way?

from Monsanto in mixed truckloads
the quick, simple way?

MONSANTO CAN DO MORE FOR YOU THAN ANY OTHER SUPPLIER. CHECK AND SEE.

	Monsanto	Your present supplier
1. **YOUR SUPPLY ASSURED** by the world's largest producer of elemental phosphorus.	✓	
2. **A COMPLETE LINE** to choose from, including alkyl benzene, anionic and nonionic surface agents, and phosphates.	✓	
3. **QUALITY CONTROL AT EVERY STEP**—because Monsanto is basic—it controls manufacture from raw material to finished product.	✓	
4. **TECHNICAL SERVICE**—ready to serve you is a staff of widely experienced experts which the size of Monsanto and the completeness of its line demand.	✓	
5. **IMPARTIAL ADVICE**—Monsanto offers you unbiased advice because Monsanto makes products in every broad class used by detergent formulators—phosphates, anionics, nonionics, alkyl benzene and phosphoric acid.	✓	
6. **RAPID DELIVERIES** regardless of your location because Monsanto has full stocks in New Jersey, Massachusetts, Michigan, Illinois, Missouri, and California.	✓	
7. **MIXED TRUCKLOAD SERVICE** with its important economies and conveniences.	✓	

For service, further information and/or copy of "Sodium Phosphates in Industry," phone the local Monsanto Office or write:

MONSANTO®

MONSANTO CHEMICAL COMPANY, Inorganic Chemicals Division, 710 North Twelfth Blvd., St. Louis 1, Missouri

WHERE CREATIVE CHEMISTRY WORKS WONDERS FOR YOU

cost of established materials, no direct comparison is possible, says Hunter, because older products cannot be used in the newly opened fields. Hunter feels that the longer life and superior performance of his pastes cancel price differentials, is looking for the new materials to soon take their place in chemical coatings.

FOREIGN DRUGS

New German patent applications cover these drug developments:

• According to Chemie Gruenenthal (Stolberg), reaction of β-dimethylaminoethyl penicillin ester with specified halogenated compounds yields

Silicon Sets Sail

SOURCE of the power activating this model aircraft carrier is a new silicon solar battery manufactured by Hoffman Electronics Corp.'s National Semiconductor Division (Evanston, Ill.). The firm's president, H. Leslie Hoffman (*above*), reports that the cell operates at 2% efficiency—twice that of earlier silicon cells. He says: "recent developments that make it possible for us to capture 10% of (solar) energy have been made in our laboratories." (At full sunlight, the sun delivers about 1,000 watts/sq. yd. of the earth's surface.) Hoffman Electronics is the only commercial source of silicon cells.

HAVEG® News

Wherever CORROSION RESISTANCE is a Factor

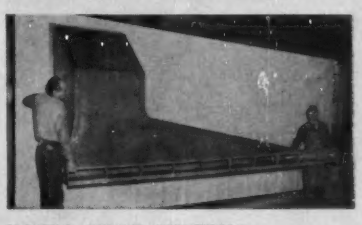
HAVEG PLASTIC TANKS MEET EVERY SERVICE REQUIREMENT

HAVEG STORAGE TANKS, REACTORS, COLUMNS, TOWERS, PLATING TANKS, FILTERS and similar equipment are now manufactured in every type and size, rectangular and cylindrical—in a wide range of Haveg grades, combined with selected chemically inert materials to provide exceptional resistance to corrosive acids, hypochlorites, salts, alkalies and various oxidizing agents.

HAVEG PLASTIC TANKS are tough and durable. Large Haveg storage tank installations have been in continuous service at leading processing plants as long as twenty-five years—under the most extreme corrosive conditions.

HAVEG TANKS are economical to install . . . easy to maintain. **NEW POLYESTER GLASS** constructions, for example, *cost considerably less installed than lead or rubber-lined, stainless or even mild steel types in many instances* . . . offer bonus savings in reduced steel for support because of their extreme light weight! Haveg plastic tanks require no painting or costly maintenance . . . can be readily field repaired where necessary.

Whether yours is a new or replacement installation, investigate the advantages of Haveg corrosion resistant plastic tanks and process equipment for your process operations. Write for Bulletin C-13.



HAVEG FUME SYSTEMS, CORROSION RESISTANT PROCESS EQUIPMENT

Haveg fume duct, hoods, stacks, fans and fittings in the Haveg reinforced plastic best suited to handle the corrosive fumes and gases at your plant, offer the most practical and economical system possible wherever fume removal is an operational requirement.

Engineered for use up to 350°F., Haveg fume removal units are light in weight for easy, low cost installation, or for heavy duty service where required. Hoods are readily molded and joined in varying shapes and sizes . . . stacks up to 12 foot diameter and over 200′ high can be flanged for quick assembly—or resin-welded as a single unit! Complete fittings are available from stock, or can be custom-fabricated to your specific requirements. A Haveg engineer will be glad to assist you in planning a complete system for your plant . . . or selecting Haveg units to replace deteriorated apparatus in your present system.

You can make anything in Haveg that you can make from metal. Haveg is tough, durable, machineable, easily and quickly altered or repaired in the field.

Haveg Bulletins F-7 and C-13 give detailed data on the complete line of corrosion resistant Haveg process equipment and resin cements to solve *every* corrosion problem. Write for your copies at no obligation.

H-604

HAVEG PLASTICS OF TOMORROW SOLVE YOUR CORROSION PROBLEMS TODAY

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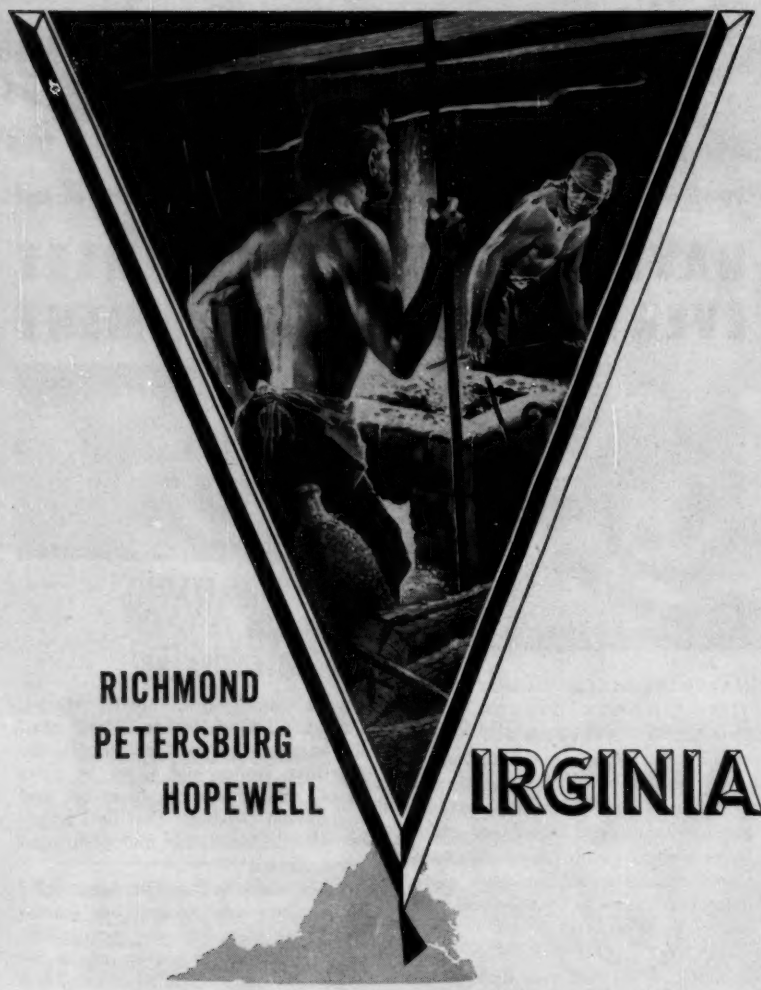

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RESEARCH

fairly low-toxicity products that have shown inhibitory power against Ehrlich's carcinoma in mice.

• Schering A. G. (Berlin) reports compounds such as 1-phenyl-3-dimethylaminoindan or 1-phenyl-1-methyl-3-piperidinoindan hydrochloride exhibit antispasmodic properties over a wide dosage range. Previously tested aminoindans, closely resembling the new products in structure, were considerably inferior in antispasmodic activity.

• Farbwerke Hoechst A.G. (Frankfurt-Höchst) researchers have reacted 8-halocaffeine with certain butyronitriles, hydrogenated the resulting cyano compounds, and turned up previously unknown compounds which possess good sedative and hypotensive properties.

• At E. Merck O.H. (Darmstadt), barbituric or thiobarbituric acid derivatives containing methylmercaptoethyl groups have proved suitable as short-acting narcotics and hypnagogics because of their rapid excretion from the body.

EXPANSION

• Shell Chemical Corp. broke ground last week for a two-story addition to its technical service laboratory in Union, N.J. The new building will contain about 25,000 sq. ft. of laboratory and office space, is slated for completion by April.

• Colgate-Palmolive Co. has dedicated a division of dental medicine on the Rutgers University (New Brunswick, N.J.) campus. It's Colgate's second industry-supported lab at Rutgers. The first: its radioisotope lab (*CW, Oct. 23, '54, p. 76*).

• Coatings and Fiberglass Research Co. (Los Angeles) is a new specialized consulting service for paint and plastic manufacturers.

• Robinette Research Laboratories (Ardmore, Pa.), surface chemistry consultants in textiles, plastics and cosmetics, has added three technologists to its staff, is also expanding laboratory facilities.

• Synthetic Mica Corp., wholly owned subsidiary of Mycalex Corp. (Clifton, N.J.), will double its research and development space at its Caldwell Township, N.J., plant site.

• Gulton Industries (Metuchen, N.J). plans to add over 50,000 sq. ft. of research, engineering and testing

Quietly.....

Without hysteria or ballyhoo, we would like to point out *quietly* that many manufacturers have had difficulty obtaining adequate supplies of Formaldehyde in the past. As the demands of industry continue to spiral, such periods of tight supply may again recur. If you want to guard against this situation, we may be able to help.

MERCK has recently opened the world's largest Formaldehyde—Hexamine plant . . . production capacity exceeds 400,000,000 pounds a year. Every pound produced is available for customer use . . . no other Merck product or operation competes for this supply. Here is a tremendous new source of Formaldehyde and Hexamine for you.

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Pyro-Processing Equipment

Rotary Kilns

Rotary Dryer-Cooler

Rotary Dryer

Rotary Kilns — True circle, all-welded construction insures best lining fit, long refractory life. Efficient heat recuperation equipment saves fuel, increases production. Air-cooled feed and discharge ends prevent kiln shell distortion and save rebricking costs.

Rotary Dryer-Cooler — Dries by parallel flow and cools by a counterflow. Unit may be fired from both ends when material is to be dried close to zero moisture content.

Rotary Dryer — Lifters shower material through stream of hot air. Dryer may also be used as cooler by using cool air.

ALLIS-

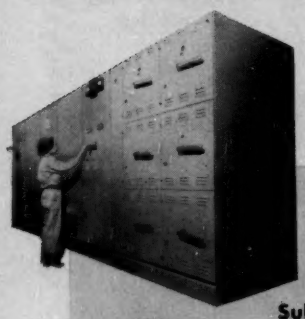
Efficient Heat Transfer . . .

. . . for higher capacity
. . . improved quality
. . . lower costs

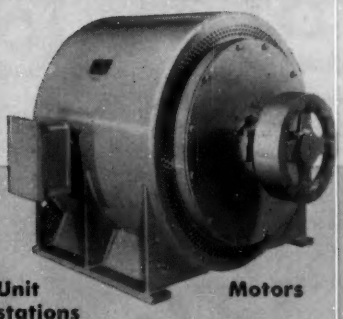
You get more when you specify Allis-Chalmers . . . because A-C "coordineers" so many phases of the installation. This means that careful thinking, planning and engineering precedes equipment recommendations.

Increased burning capacity . . . better heat recovery, faster cooling . . . lower power consumption . . . maintenance economy—all these considerations are given careful study. Electrical engineering groups work closely with pyro-processing engineers in the planning stage, so that all electrical and control requirements are worked out to give you the best possible overall results.

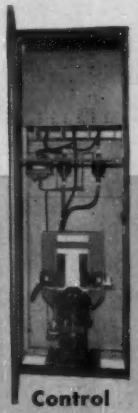
This is Allis-Chalmers "coordineering," as it has evolved from more than 50 years' experience in building and applying pyro-processing equipment. Only with this approach can you get maximum operating capacity and improved product quality at the lowest cost.



Unit Substations



Motors



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PLANT	2	Compacting Mills Roller Mills Screens Ribbon Flight Dryer
PYRO-PROCESSING	3	Furnaces Kilns Coolers Dryers
POWER	4	Generators Condensers Pumps Transformers Switchgear Substations Motors V-belt Drive Control Rectifiers
LIQUID HANDLING	5	A complete line of Centrifugal Pumps
AIR & GAS HANDLING	6	Centrifugal Blowers Axial Compressors Rotary Compressors and Vacuum Pumps

Allis-Chalmers also makes equipment for solvent extraction, electronic heating, metal detection and inter-floor conveying.

Bulletin 25C6177 covers all Allis-Chalmers equipment for the process industries. Bulletins on specific equipment lines are also available. See your Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

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A-3079

A Better Look for the Looking-glass...with

Tin Chemicals

BACK IN 500 B. C.
tin was employed in the oriental art of mirror-making. Since glass was unknown to them, Chinese craftsmen needed a metal that would take a high polish and impart hardness to the overall alloy. Tin, added to copper and lead, produced white bronze which remained the basic raw material of oriental mirrors for fifteen hundred years.

AROUND 1860 chemists began to experiment with salts of tin as sensitizing agents in the preparation of the silvered mirrors of modern times. It was found that, when glass was treated with a tin salt solution, the silver deposit adhered better and formed a much more uniform film over the entire surface of the glass. Today "sensitizing" is standard procedure in the manufacture of mirrors, and M & T Stannous Chloride Anhydrous is one of the most dependable preparations made for this purpose.

•

THE VERSATILITY OF TIN CHEMICALS is by no means limited to mirror-making. In *any* field—automotive, aviation, textile, food, plastics—if you're looking for ways to lower costs or improve techniques, it will pay you to get in touch with us—

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RESEARCH

space for use by its five associated companies: Gulton Mfg. Corp., Glenco Corp., Vibro-Ceramics Corp. Thermistor Corp. of America, and Greibach Instruments Corp.

• W. P. Fuller & Co. has broken ground for a new paint research laboratory in south San Francisco. Seventy-five chemists, chemical engineers and technicians will be employed in the new building, a 50% increase over the present staff.

REPORTS

New government chemical research reports available from the Office of Technical Service, U.S. Commerce Dept., Washington 25, D.C., include:

• "Control Method of Chemical Analysis of Barium Titanate" (PB 111780, 75¢) describes a new procedure to analyze the compound: gravimetric and volumetric analysis is used for the major and principal minor constituents, flame photometry for hard-to-analyze minor constituents, spectrography for less common minor components and as a check that no major unsuspected impurity is present.

• "Basic Studies on the Chemistry of Fluorine Compounds" (PB 111959, $3.75), a final report of research conducted at Cornell University on fluorine compounds under the Army's arctic rubber program. Results are described of work in three principal areas—radical addition reactions of perhalo olefins, condensation reactions of perhalo compounds, and synthesis of fluorinated vinyl ethers.

• Atomic Energy Commission technical reports recently released to the public through the agency's accelerated declassification and release program are listed in eight free price lists. These are TID-1901, TID-1902, TID-1903, TID-1904, TID-1905, TID-1906, TID-1907, TID-1908.

LITERATURE

• "Refractory Molybdenum Borides" is the title of Climax Molybdenum Co.'s (New York) new bulletin describing preparation, applications and properties of molybdenum boride compounds.

• Central Scientific Co. (Chicago, Ill.) has a new complete catalog of laboratory balances and weights. It also contains the latest government weight classifications and tolerances.

PLASTIC RAINWEAR is a good example of the way vinyl products can be improved by the right Hercoflex plasticizer specifically chosen to provide the wide range of basic properties needed.

PLASTIC TOYS are another of the end products that give longer service when a Hercoflex plasticizer is used. No matter what the service requirements, there is a member of the Hercoflex family to supply them.

Rain or Shine

HERCOFLEX PLASTICIZERS IMPROVE VINYL PERFORMANCE

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The Hercoflex family has been developed specifically for those vinyl processors who realize that no single plasticizer can be versatile enough to meet all requirements. That's why so many processors are becoming better acquainted with the Hercoflex family, so that they can select the *one* plasticizer that will do their specific job best.

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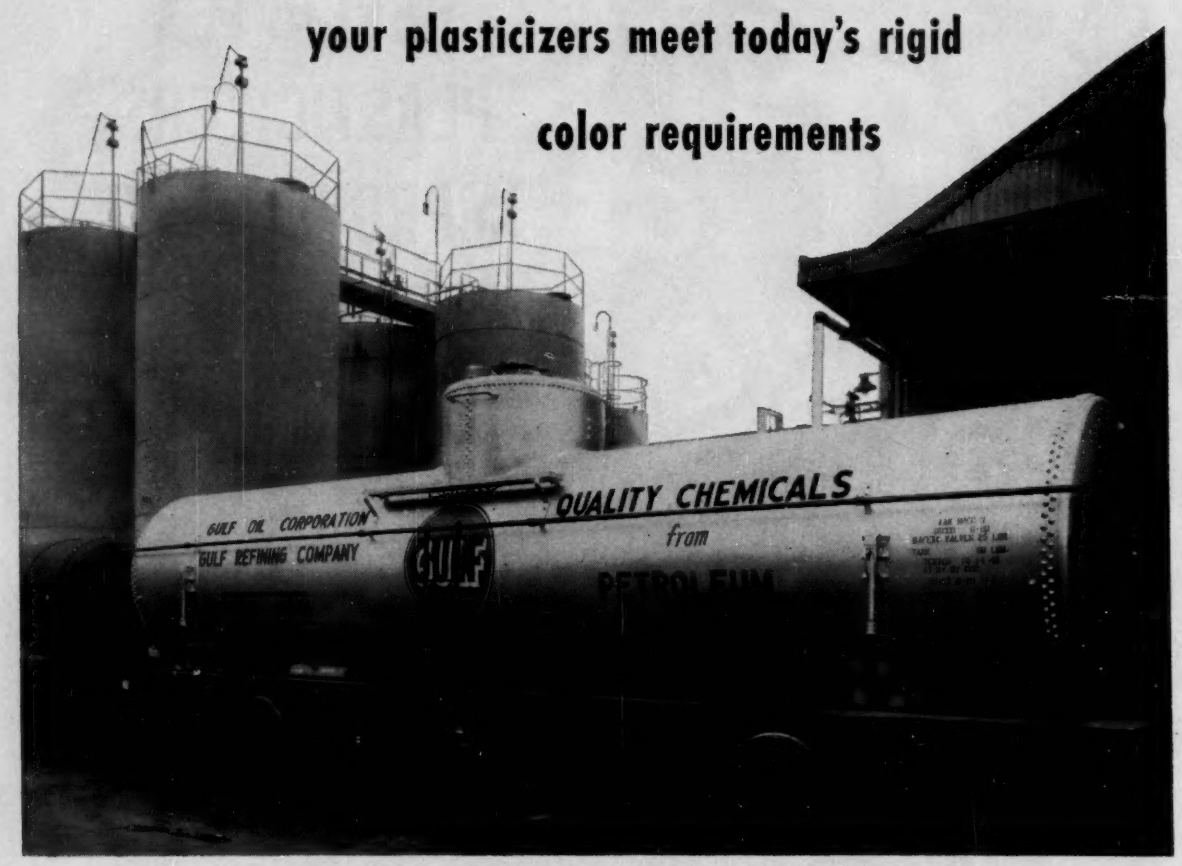

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CHEMICAL WEEK
July 14, 1956

Here's a new chemical angle for rocket or jet fuel researchers: the use of flame suppressants to cool the exhaust.

Thus far, the emphasis has been on developing materials of construction and cooling systems to withstand the high exhaust temperatures. Getting the right materials has posed a real challenge to metallurgical engineering, while the cooling-system approach has proved costly and cumbersome. What's more, a cooling system adds undesirable weight to the missile.

A chemical additive would circumvent these drawbacks. Not too much is known about the extent of chemical work that has been done. But at a recent meeting of the American Rocket Society in Cleveland, John Becker of Aerojet General outlined a project he had conducted.

Becker tried four chemicals—liquid bromine, sodium nitrite, potassium nitrate and potassium nitrite—found that they could considerably reduce the exhaust temperatures. In one trial, for instance, he found that chemicals dropped the temperature (of a reflected surface) from 400 F to 120 F.

Becker tried adding amounts up to 5% of the fuel. In general, an addition of approximately 2% seems to be the optimum. Theory behind the work has only been partly explored. And it is not clear whether the project has been abandoned or not.

•

Du Pont is offering a new grade of silicon to encourage more work on the element as a means of converting sunlight directly into electricity. To be called "solar cell" grade, the new grade will go for $180/lb. Though not exactly a bargain-basement price, that represents a considerable cut from the $350/lb. material needed for transistors and similar devices. Systems for converting sunlight to power require high-purity material, but their purity requirements are a lot less stringent than those of transistors. A solar converter is now operating in Americus, Ga. (*CW, Oct. 8, '55, p. 95*).

•

Olin Mathieson will build a plant at the Lake Ontario Ordnance Works to make "high-energy" fuels for the Air Force. The plant is due to start up during the last quarter of this year, but as yet there's no indication as to size or scope of the project.

Just two years ago, the Navy admitted that it had signed a contract with O-M for a project at the Model Town government site in the Niagara Falls area. Earlier reports from there had the firm building a unit for the Air Force to make a propellant identified only as "Zip," presumably a coal-based fuel. There is no information now on the relationship of the work being done by the company for the two services.

O-M is, of course, no stranger to the rocket industry. It supplies chemicals (e.g. anhydrous ammonia, hydrazine, unsymmetrical dimethylhydrazine, methanol) and is half owner (with Marquardt Aircraft) of Reaction Motors.

Technology Newsletter

(Continued)

Hopes that house flies would not develop immunity to organic phosphorus insecticides received a serious setback last week with a report in *Science*. J. Keiding of the Government Pest Infestation Laboratory in Sprinforbi, Denmark, experimented with three thionophosphates (parathion, Diazinon, Bayer 21/99), concludes: ". . . development of resistance may impede the control of house flies even with organic phosphorus compounds."

Phosphorus insecticides, an outgrowth of war-time nerve gas research by I. G. Farben, have been the subject of a lot of research in this country (*CW, Sept. 3, '55, p. 79*). Their high potency had led to the hope that insects would not develop resistance to them.

•

Aerial mapping is gaining popularity with process industry firms. Kennecott Copper now reveals that it uses aerial photographs to chart progress on its Bingham Canyon copper mine, the largest open pit copper mine in the world.

The hole there covers 972 acres. Formerly, to find out what was happening, survey crews would spend months mapping the area. By the time they finished, the information was out of date. Now, a private firm does the job in a matter of hours, every six months.

One of the earliest uses of the aerial technique to check on processing operations was the TVA's aerial inventories of its coal and chemical stockpiles (*CW, Oct. 25, '52, p. 51*).

•

Two new antibiotics have scored gains against pus-forming organisms that resist currently available drugs. Cathomycin (Merck) and PA-105 (Pfizer) proved better than 95% effective against clinical strains of *Micrococcus pyogenes* that are resistant to both penicillin and tetracycline. The organism is found in abscesses, boils and wound infections; controlling it is a high-priority research activity. The recent investigations were done at the Walter Reed Army Medical Center and George Washington School of Medicine.

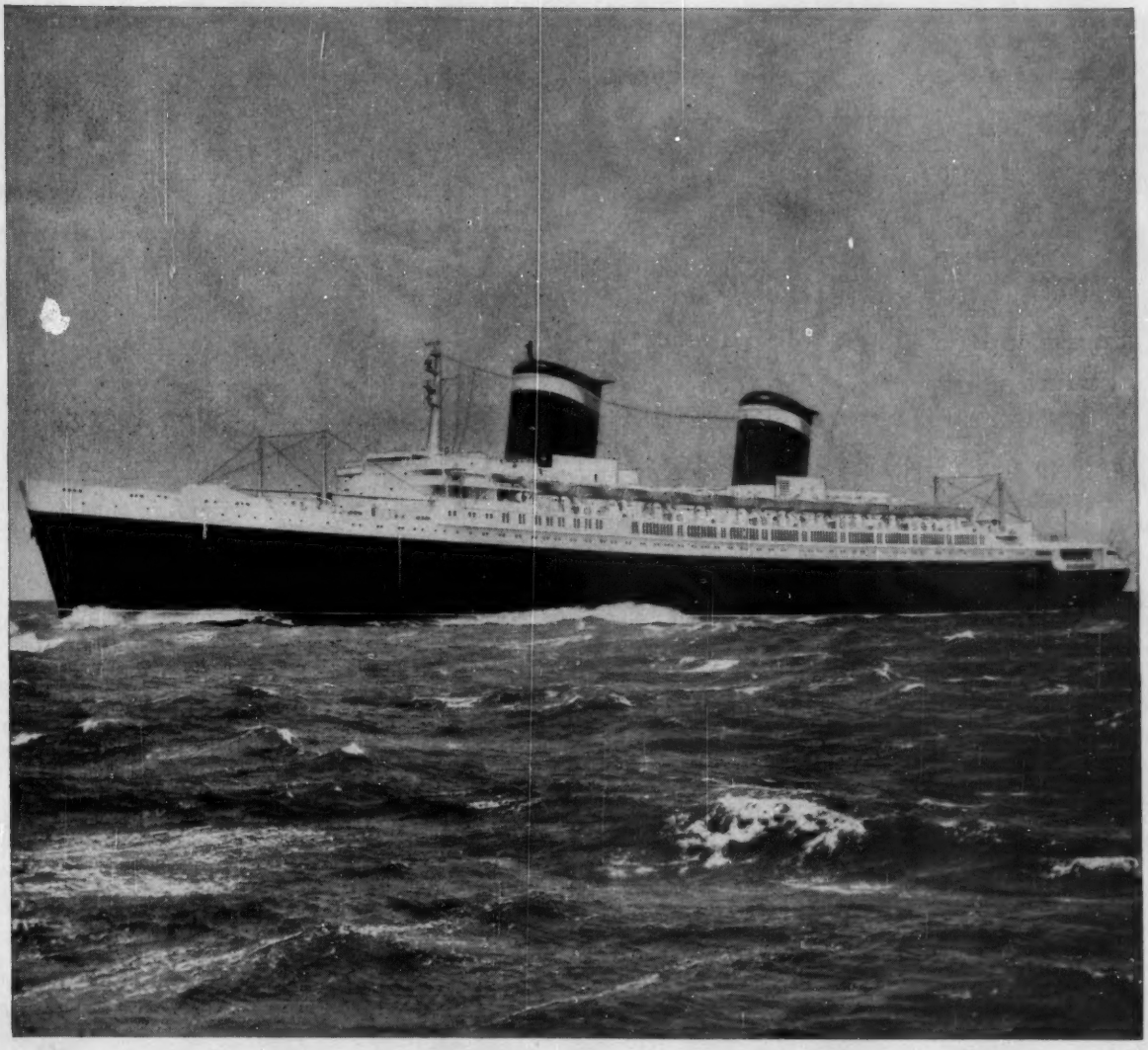
•

It's a sign of the times. American Companies must keep posted on European chemical developments. Atlantic Refining just set up an office, established a man in Hamburg, Germany, to keep tabs on technical developments there and to handle licensing of "Catforming."

Armour Research signed up 18 firms to send a team of observers to Europe. Among the process industry companies sponsoring the trip: Parke, Davis; Quaker Oats; American Hard Rubber; International Minerals and Chemical; Mosinee Paper.

•

Bergwerksgesellschaft Hibernia now officially confirms its interest in polypropylene (*CW Technology Newsletter, Feb. 4*). It will start up a test plant to gather data on the process and the product.



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ESSO

PETROLEUM SOLVENTS

RESEARCH AND EXPERIENCE DEVELOPED THE FINE CHARACTER OF ESSO SOLVENTS

Three Ways to Separate Thorium from the Rare Earths

Sulfuric	digestion of sand in hot sulfuric acid	dilution with water	precipitation of thorium (e.g., by adding ammonium hydroxide) and purification	precipitation of rare earths (e.g., by adding more ammonium hydroxide)
Caustic	digestion of sand in hot caustic soda to separate out the phosphorus as soluble phosphates	digestion in hydrochloric acid	partial neutralization to precipitate thorium	additional neutralization to precipitate the rare earths
Chlorine	briquetting the sand with charcoal	purging reactor with nitrogen	chlorination to remove impurities as volatile chlorides	extraction with nitric acid

Why Choose the Sulfuric Route?

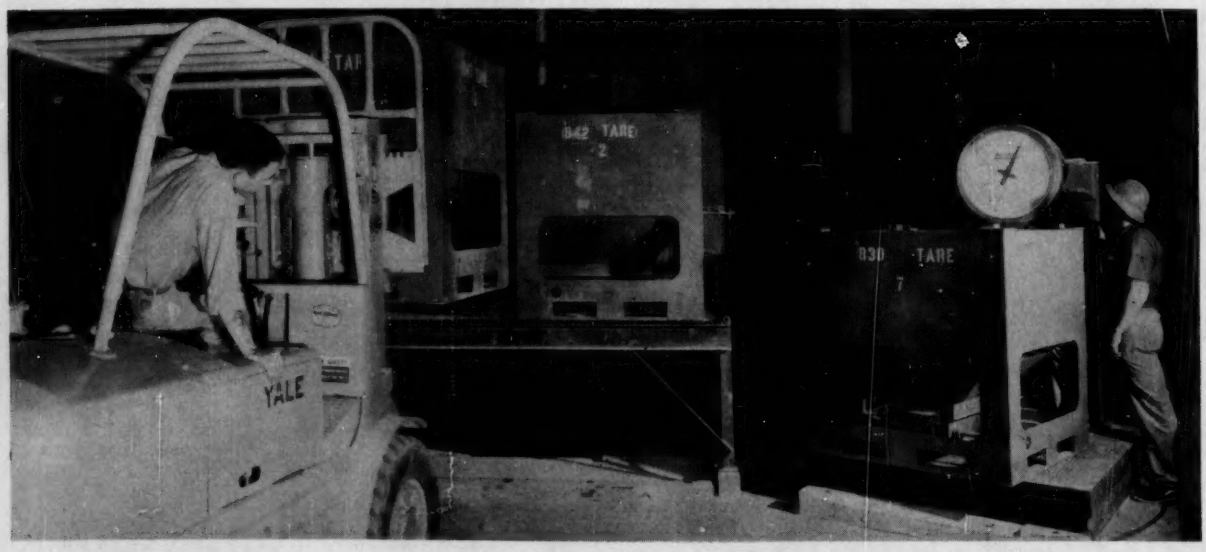
A $2-million plant capable of treating 15-25 tons of monazite sand a day and separating it into rare earths and thorium metal is gradually being moved up to capacity operation at Curtis Bay, Maryland, this week. It's billed as "the largest and most modern" of its type ever built. Yet it's using a sulfuric acid digestion, one of the oldest known processes to do the job.

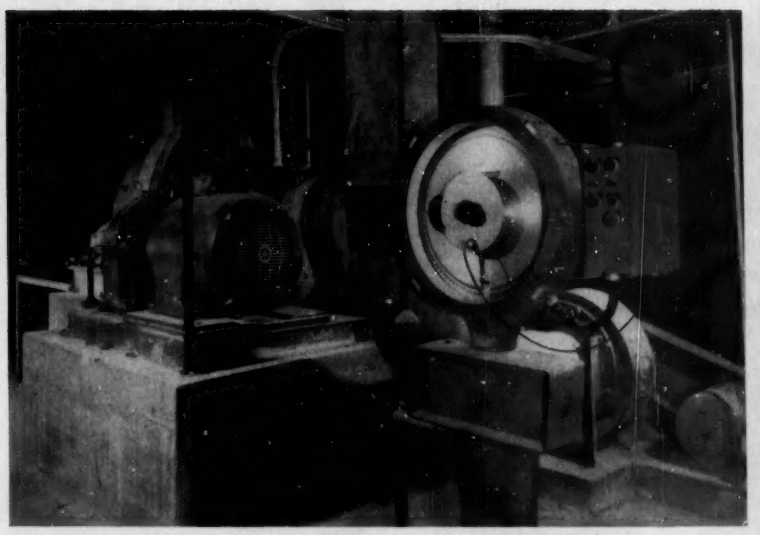
To unravel that paradox, you have to look at the operation as it ties into the other activities of the corporation: The plant is owned by Rare Earths Inc., which is now an affiliate of Davison Chemical. The process uses sulfuric acid as a raw material and produces phosphoric acid as a by-product. Davison, big in fertilizers, has large sulfuric acid plants in the Curtis Bay area, and needs phosphoric acid there. What's more, the sulfuric acid process, although not as attractive on some counts, is more flexible. It's more suitable for a wider range of raw materials than, say, the alkaline digestion method.

Engineers of Rare Earths put forth an additional argument that clinched the decision. At the firm's Pompton Plains, N.J., plant they had worked out some modifications of the classical process that, they felt, helped make up for some of its disadvantages.

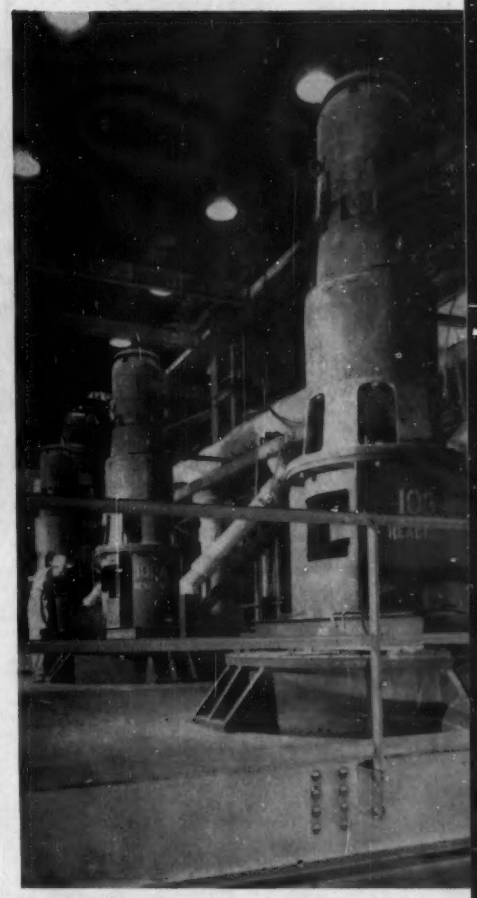
Right now, the firm is keeping its

1 AT CURTIS BAY plant, monazite is weighed and sampled . . .





2 sent through a ball mill . . .



3 digested with sulfuric.

own counsel about the details of these modifications. About all it is willing to admit about its operations is this:

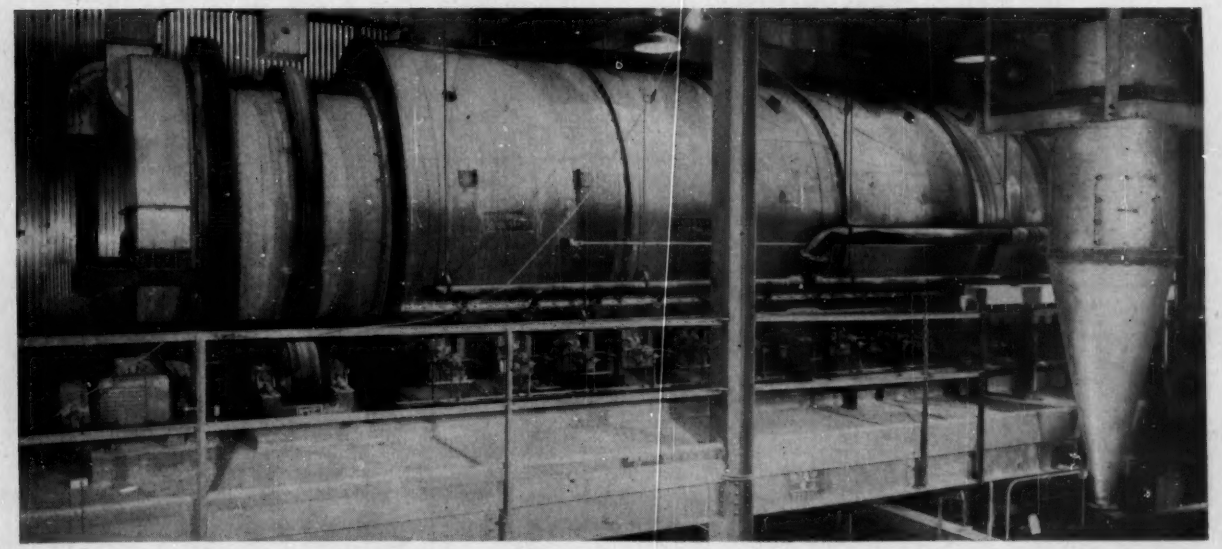
Monazite is received in bulk or bags, unloaded into special hopper bins, weighed and conveyed through a sampling system. It is ground in a ball mill, weighed again and sent to the reactors where it is digested with sulfuric acid.

The acid converts the phosphorus in the sand into phosphoric acid. Rare earths remain insoluble in the sulfuric acid-phosphoric acid mixture. They are dissolved in water, freed from other metallic salts by sedimentation, filtration and precipitation. Finally, they're converted into the appropriate finished product.

Down in Steps: Rare Earth's reticence about its operations is not surprising, for the field is one in which know-how is highly prized, zealously guarded. The pioneer, Lindsay Chemical Co., uses a sulfuric acid process* too, although it undoubtedly has some

*As described in Chemical Engineering, Jan., '53.

4 RARE EARTHS remain insoluble, are cleaned up and dried.



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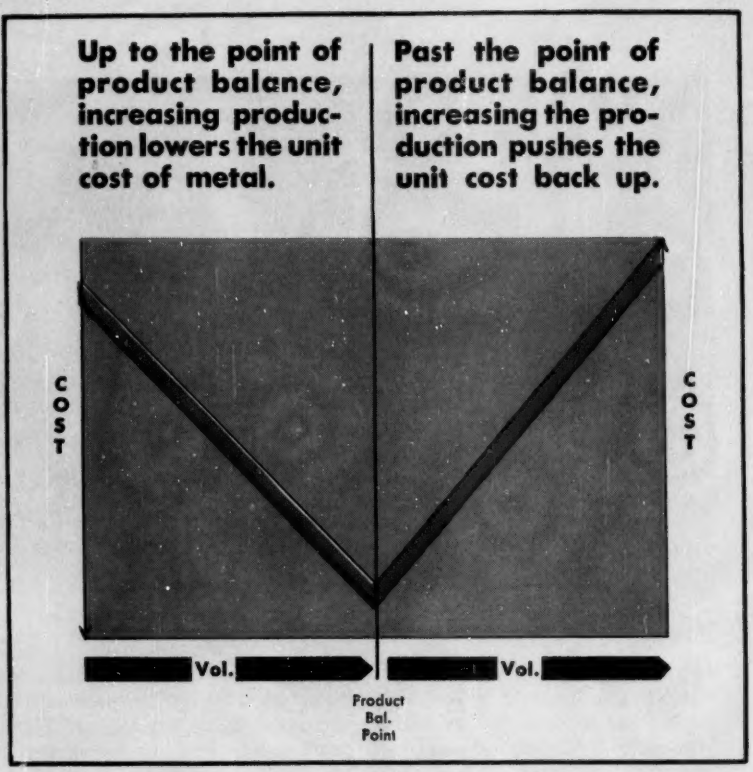

Up to the point of product balance, increasing production lowers the unit cost of metal.
Past the point of product balance, increasing the production pushes the unit cost back up.
COST
COST
Vol.
Vol.
Product Bal. Point

Rare-Earth Cost Dilemma

A chart like the one above could be drawn for each of the 18 distinct products that can be produced from monazite sand. It arises from the simple fact of having a single source for a large number of products.

For example: in 100 lbs. of monazite, there are 3 lbs. of praeseodymium and 12 lbs. of neodymium. That's fine as long as the market for neodymium is four times as great as that for praeseodymium. But supposing the demand for both is the same. It would mean that you'd be producing exactly four times as much praeseodymium as you'd need. And the extra costs involved would have to be charged to neodymium. In short, after you've reached the point where there's a demand for all products produced, the unit cost of any one product increases.

This same relationship will hold true, of course, for any chemical process that turns out more than one product. Fortunately, there are few processes where co-products are involved as much as in rare earths.

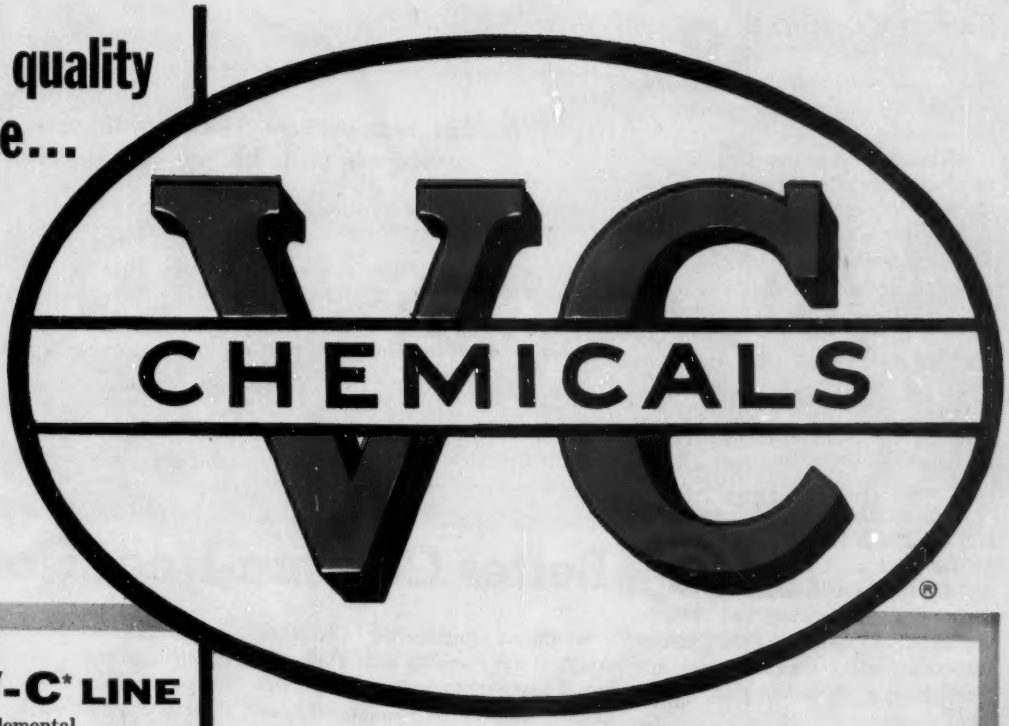
---

fairly extensive modifications of the classical approach.

Actually, there are several known variants of the sulfuric acid method. One is to treat the sand with hot concentrated sulfuric to convert the rare earths and thorium into sulfates. The mixture is diluted and the pH is brought up to 1.0 by adding ammonium hydroxide. This precipitates all the thorium and about 5% of the rare earths. Because there are a lot more rare earths in the sand to start with, the precipitate consists of roughly half thorium phosphates and half occluded rare-earth sulfates. These are dissolved in nitric acid and the thorium nitrate is extracted with an organic solvent.

The rare earths that remain in the mother liquor from the first precipitation can be precipitated by adding sodium sulfate, oxalic acid or other agent. Alternately, they can be precipitated by bringing the pH to 2.3. And then on additional adjustment of the pH (to 6.0), the uranium and residual rare earths come down. They're filtered

Better quality on time...



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2-ethylhexyl octylphenyl phosphite
Tricresyl phosphite
Diethyl ethylphosphonate
Dibutyl butylphosphonate
Bis(2-ethylhexyl) 2-ethylhexylphosphonate
0,0,0-Triethyl phosphorothioate
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and other organophosphorus compounds and phosphatic specialties.

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*REG. U. S. PAT. OFF.

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Chemicals Division: 401 EAST MAIN STREET, RICHMOND 8, VIRGINIA • *Phone 2-0113*

off, treated with nitric acid and the uranium nitrate extracted with an organic solvent.

Alkaline Alternative: One of the drawbacks of the sulfuric acid process has been the difficulty in getting rid of the phosphorus which shows up in the product as phosphates. This can be overcome by the use of the alkaline digestion process. This, in fact, is how the Sao Paulo (Brazil) plant and the Alwaye (India) plant operate. The former has been cracking 2,000 tons of sand per year since 1949, while the latter started up only last July. The alkaline process will also be the basis of Crane's rare-earth operations.

In the alkaline method, the monazite is reacted with hot concentrated caustic (or soda ash). This converts the metal phosphates present into insoluble hydrous metal oxides and soluble sodium tripolyphosphate. The hydrous rare-earth oxides (and thorium) are dissolved in hydrochloric acid. Partial neutralization causes a thorium product to precipitate. (Uranium comes down here too.) A high-grade rare-earth hydroxide is then precipitated by further neutralization.

A third possible approach to the rare-earth-thorium separation, worked up by Australian researchers, is chlorination. The process is thought to have advanced as far as the laboratory scale. But although it looks attractive from many standpoints, it has not been proved on anything approaching a commercial scale.

In the chlorination process, the phosphorus is converted into volatile phosphorus oxychloride. Other impurities present in the sand (iron, silica, titanium, aluminum, zirconium and tin) are also converted into volatile chlorides. Thorium does not react at all until more than half the rare earths are chlorinated. Then it reacts more slowly than the remaining rare earths.

On small scales, the process has been capable of 90% yields, over-all chlorine efficiencies of 75%.

Moving Up: Whatever else Rare Earths' new plant accomplishes, it will make the firm the second largest rare-earths processor (dislodging Maywood Chemical from that spot). Lindsay, however, will continue to be the biggest producer: Lindsay reveals that its new plant can treat up to 9,000 tons/year, while its older operation gives it a reserve capacity amounting to another 3,000 tons/year.

For temperature-critical distillation, Turbogrids with hollow tubes offer:

- **Efficient internal heat exchange — up to 300 Btu./hour/degree F/sq. ft. of column cross section.**
- **Low pressure drop — as small as 0.70 mm. Hg./tray; 3-4 mm. across the entire column.**
- **Low capital cost — as much as 20-25% lower than hollow bubble-cap columns of equivalent capacity.**
- **Reduced operating costs, minimum of maintenance.**

It all adds up to . . .

Better Column Heat Control

Southwest Engineering Co. (Los Angeles) has come up with a new internal heat exchanger that, it says, will greatly simplify distillation of heat-sensitive products. It's a modification of Shell Development Co.'s* Turbogrid distillation tray (CW, April 4, '53, p. 63), constructed with hollow—instead of solid—tubes to permit circulation of heating or cooling media through the tray.

Sweco has already built one hollow-tube Turbogrid unit for a West Coast fatty acid plant, is now putting the finishing touches on a fully instrumented, automatic package plant based on the new tray.

Like the original Turbogrid, the modified tray consists of alternate parallel slots and tubes, properly spaced to give a calculated flow pattern of vapor and liquid. Construction does not differ markedly from the basic design, except for manifolding of the hollow tubes into the side supports.

Beats Bubble Caps: Though the individual tray efficiency of the Turbogrid is generally less than that of a well-designed bubble-cap tray, capacity of grid trays may be 20-100% higher. Too, the low pressure drop and closer spacing afforded by grid trays result in less pressure drop per theoretical tray, a column height about the same as an equivalent bubble-cap installation.

Compared with internally heated, hollow bubble-cap trays, Sweco's hollow grid unit is less costly to build and maintain, provides substantially greater heat transfer surface. About 2.5 sq. ft. of tube surface per sq. ft. of column cross section are available for heat transfer.

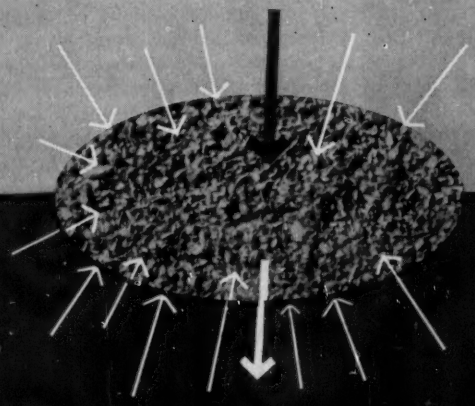
Heating medium may be steam, Dowtherm vapor, etc., depending on process requirements. Intimate contact between liquid-vapor mixture and the tray surface produces high heat transfer coefficients and, under the best conditions, heat fluxes to 300 Btu./hour/degree F/sq. ft. of column cross section. High liquid viscosity on the tray side, scaling and fouling decrease heat transfer, but to no greater extent than would be experienced in other types of internal exchangers.

Fatty Acid Plant: The first commercial hollow-tube unit, says Sweco, has been a boon to fatty acid processing. To command top prices, fatty acid products must be almost colorless. By permitting differential addition of heat at each of several trays, the Turbogrid column obviates long residence time and local overheating, thereby minimizing color degradation of the products.

The results obtained in the fatty acid installation can't be represented in a simple manner. A definite economic balance exists between product color and fatty acid recovery. If the process is operated to produce very low free fatty acid in the bottoms, the color suffers. But with the hollow-tube grids, brown-grease fatty acids (derived from pork) have been made with a Gardner (1933) color index of 2

*Other companies licensed by Shell include: Pfaudler, for the production of glassed-steel and glass Turbogrids (*CW, May 26, p. 46*); National Carbon, for the production of Karbate trays.

M & C Natural Minerals At Work *sixth in a series*



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Want Anti-Caking Protection? This, too, is a job for M & C's low-cost sorptive materials. For example, in most cases less than 1% will condition even the most sticky, waxy or hygroscopic chemicals.

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when splitting only 10% of the feed to bottoms. The maximum column temperature is 480 F with a pressure of 6-7 mm. Hg. at the bottom of the column.

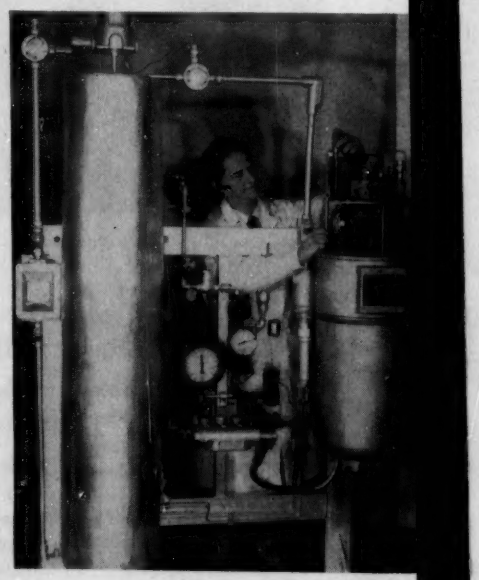
Other Applications: Though Sweco has been concentrating on columns for heat-sensitive materials, that's not the only use it sees for the new system. Efficient internal heat exchange should also be useful for dehumidification of gas streams, generation of internal reflux, intercooling of liquids (as in an absorber), and increasing cooling tower capacity.

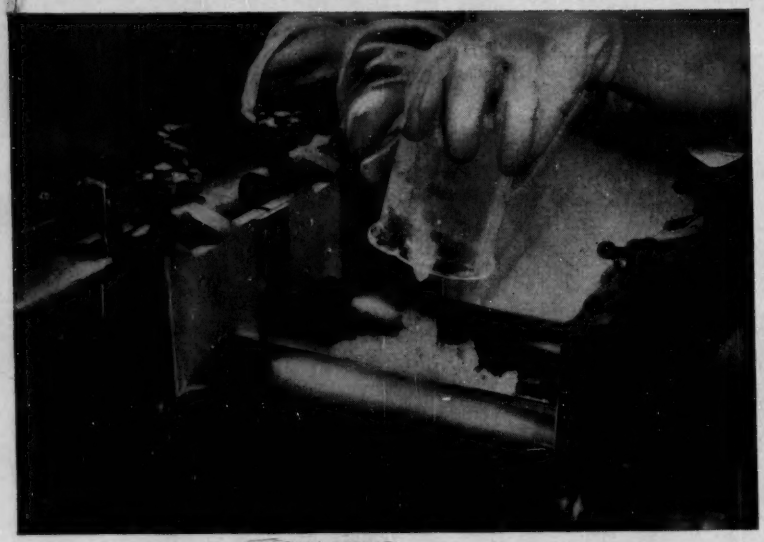
In gas stream dehumidification, for example, the large latent heat released often requires excessive circulation of process liquid over the trays to both cool and dehumidify the vapor to the desired dew point. Removal of part or all of this heat load via cooling media in hollow Turbogrid trays would result in substantial savings in capital and operating costs.

In these and other installations where hollow Turbogrids can provide adequate heat transfer surface, says Sweco, they're probably the most economical means of reducing heat loads, increasing capacities of overburdened external exchangers and pumping systems.

•

Explosionproof Scale: Richardson Scale Co. (Clifton, N.J.) is out with an automatic scale meeting Under-





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writers' Specs. for Class I, Group D hazardous gas and vapor operating conditions. Tagged Model GGG-38, it features an air-operated discharge mechanism and special motor and electrical components. The scale weighs up to 250 lbs. per draft, has a normal speed range of up to seven 100-lb. weighings per minute. Weighing accuracy is 0.25%.

•

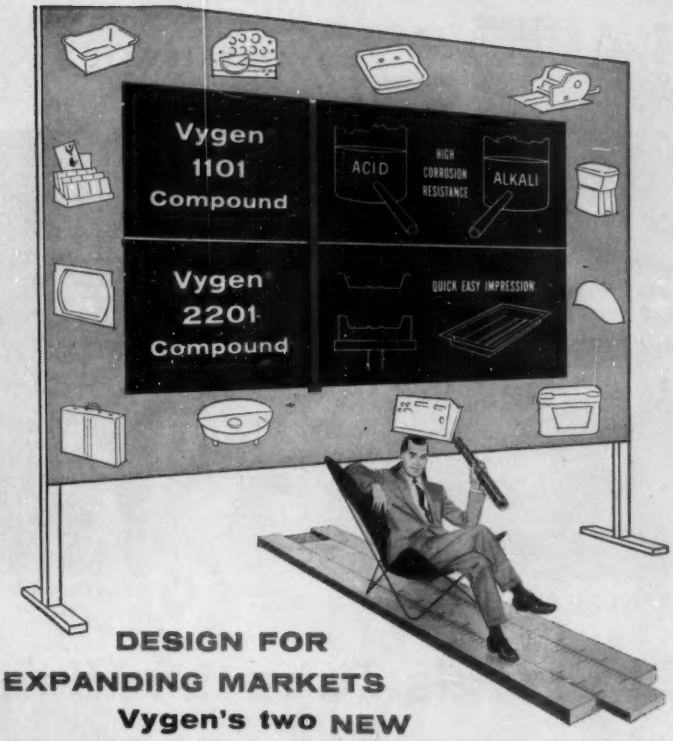
Pressure Filter: Dorr-Oliver, Inc. (Stamford, Conn.) offers a new, high-capacity water filter, called the Hi-Rate Pressure Filter. The unit is an upflow, precoated, leaf-type pressure filter, equipped with a remote control system for "foolproof" regulation of precoating, filtration and backwashing in proper sequences. D-O says the unit will operate at rates of 1.0-1.5 gpm./sq. ft. of filter area.

•

Miniature Voltage Regulator: Chatham Electronics Division of Gera Corp. (Livingston, N.J.) says its new Type 6627/OB2WA miniature voltage regulator maintains practically constant operating voltage over a 5-30 milliampere range, with only small voltage drift over the life of the tube. This new, two-electrode, inert gas-filled, cold-cathode tube has improved shock and vibration resistance. Its maximum bulb temperature, 150 C; minimum ambient, —55 C.

Chromatography Onstream

ONE GOOD continuous chromatograph onstream is worth several in advanced stages of development. So it's noteworthy that Esso Standard Oil has just put a tailor-made analyzer on the production team at its Bayway refinery (Linden, N. J.). Invented by Esso physicist Charles Skarstrom *(shown with unit, left)*, the instrument replaces a time-consuming routine of daily sampling and laboratory analysis, automatically records gas-stream composition at half-hour intervals. The unit is explosion- and weatherproof, cost $12,000 to build. A duplicate model is now being readied by Esso Research labs for a second installation at Bayway later this summer.



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- ☐ VYGEN-110 Polyvinyl chloride resin
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READY TO ROLL: Zep's trailer helps its . . .

Chemicals Take the Highroad to Sales

Profiting by the experience of a small but growing group of chemical makers, salesmen for Zep Manufacturing Co., an Atlanta, Ga., chemical specialties producer, this week are taking to the highways for sales. They're using a 35-ft. converted house trailer as a traveling showroom, are routing it through most of the southern states in an aggressive bid to boost sales.

Zep's use of a trailer for sales purposes follows similar applications in recent years by such other chemical industry firms as Fisher Scientific, Hercules Powder, Armstrong Cork (*CW, July 24, 1954, p. 46*), Lederle Laboratories, Kaiser Aluminum, and Borden Co.

Consensus: it's a valuable tool. Zep, for example, has had its trailer only a few weeks, yet its success is such that the company will extend the tour into the Midwest. Itinerary and stops are determined by Zep's salesmen, with the trailer "passed" from salesman to salesman on its junket through the territories. Both salesman and trailer-tractor driver live on board.

Generally, Zep's men demonstrate their wares to purchasing agents and plant maintenance personnel. Cost of keeping the trailer is about $15,000 per year including salary of the driver.

Fisher Scientific, too, considers trailer promotion highly satisfactory and financially worthwhile, although it is not currently operating such a unit. The company bought a custom-designed unit for $15,000, fitted it with $10,000 worth of instruments and lab furniture and kept it on the road two years, sold it last fall after it had served its purpose. Fisher's "Mobilab" was the responsibility of the sales department although the advertising section handled advance publicity.

An assistant sales manager traveled with the unit, assisted by the salesman in each territory the caravan passed through. The trailer was routed south in the winter, north in the summer, stopped at plants, universities, public health organizations and conventions. About 18,000 miles were logged, and some 42,000 people viewed the mobile display. Exhibits were changed to meet the interests of the audience.

Fisher estimates that costs approximated 38¢/mile. Of this, about 23¢ went for depreciation (over five years), 12¢ for gas, oil, storage and miscellaneous, 2¢ for insurance. These costs exclude advertising, brochures and advance promotion.

Hercules Powders' trailer, the "Mobile Lacquer Information Center," was used to demonstrate the products of the firm's nitrocellulose division. In 1953, the unit was shown to 401 groups, was visited by 5,000 people, covered 8,000 miles. A local salesman joined the trailer at each stop to assist the regular trailer staff. Now this trailer is used mostly in the Wilmington, Del., area.

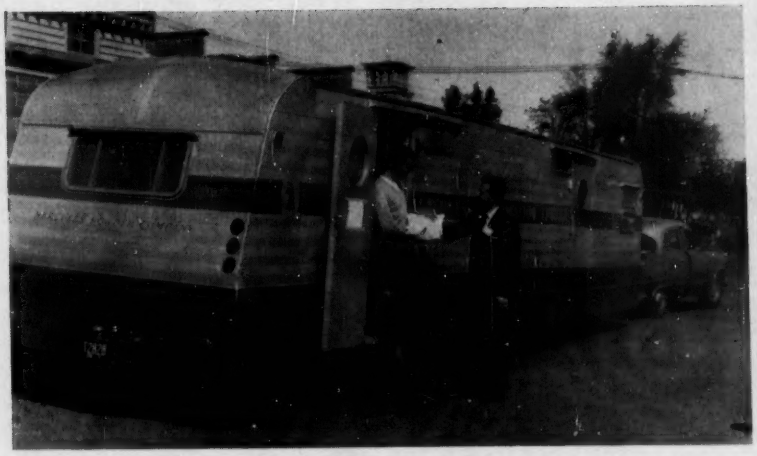
Lederle Laboratories put a caravan to still another use—demonstration of veterinary products to cattlemen and farmers. Farmers' gatherings, 4-H club meetings and agricultural colleges were the most frequent targets. Hillbilly music and movies helped drum up interest over the 30,000-mile route.

By and large, most chemical companies do not actively solicit orders during trailer promotion. Basic aim is merely to demonstrate products, spur interest and create goodwill.

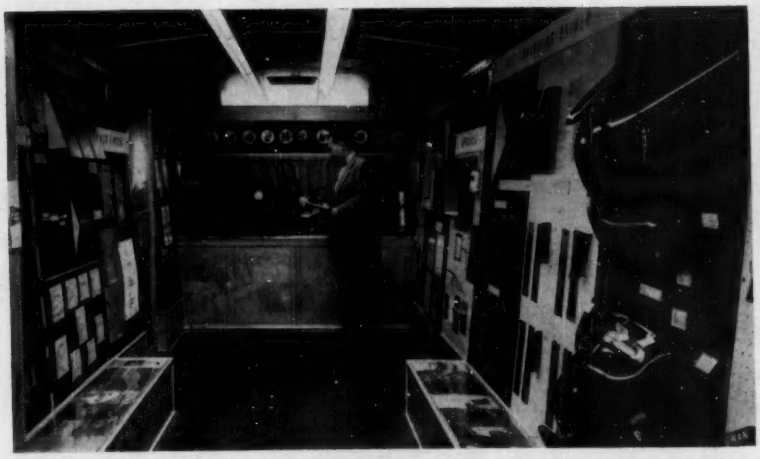
For that reason, results of trailer promotion are hard to measure. Yet, benefits are none the less real.

Kaiser Aluminum, now displaying electrical conductor products in a trailer, describes it as "most useful in demonstrating proper practices to linemen, engineers and distributors; exceptionally well received." And Borden, which "wore out" one trailer in teaching farmers correct techniques (including use of farm chemicals and feed supplements), will probably get a new trailer next year.

Extensive use of sales trailers by the chemical industry, say trailer producers, is being balked by "fear of looking like a peddler." Too, industrial purchases aren't made by showmanship. Still, the trailer's a help in displaying a product's characteristics.



TOKEN OF REMEMBRANCE: Visitor to Hercules trailer is given literature.



SPRUCE-UP TIME: Before opening doors, Hercules salesman checks exhibits.

RANCHER REVIEW: Cattlemen learn about Lederle veterinarian products.

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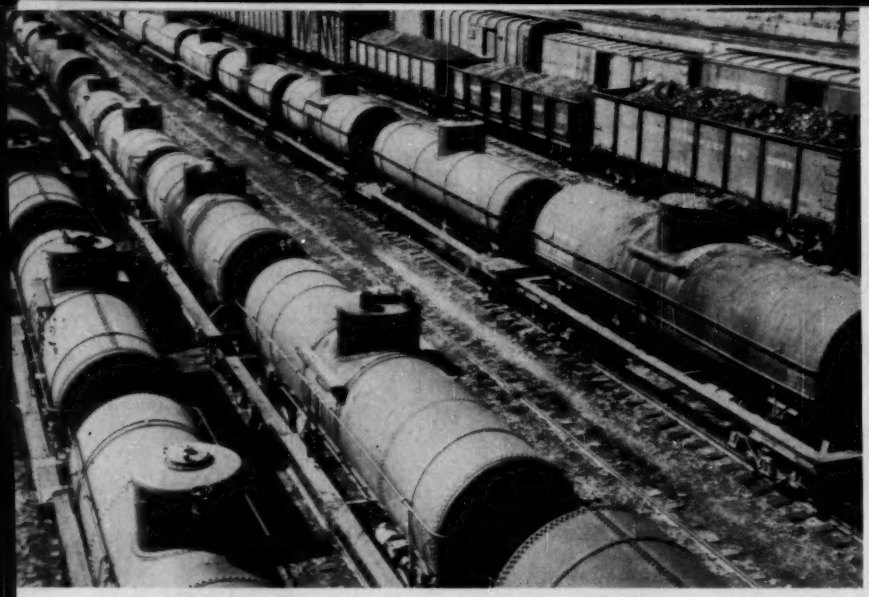


TANK-CAR SPECIFICATIONS: ICC faces a decision as . . .

Battle Nears on Design

There's a move afoot by New York State Labor Dept. officials to get the Interstate Commerce Commission to change its tank-car specifications. Recommended: three manhole entries in each tank car instead of the present single unit; and each of the three would be 24 in. in diameter minimum instead of the present 16 in.

Behind the request for new tank-car specs is an accident that occurred May 16 at Metal Cladding Inc., a North Tonawanda, N.Y., tank coating firm. Two workmen, removing rubber coating from a tank car—using petroleum naphtha and xylene—were killed when the vapors exploded. The State Labor Dept. investigated the case, and in a written report signed by Jack Baliff, associate industrial hygiene engineer, and Dr. Irving R. Tabershaw, director of the Industrial Hygiene Division, it was recommended that the specifications be changed.

Pushing the recommendations for the State Labor Dept. is Ben Blackwood, assistant industrial commissioner. "Tank cars," he told CHEMICAL WEEK, "as now designed are death traps during cleaning activities." He has recommended to Isador Lubin, state industrial commissioner, that the matter be referred to ICC. Lubin has seen the report but hasn't yet sent it on to ICC.

If Lubin does recommend the changes to ICC, he'll find that getting them through will be a mighty tough job. ICC generally sends recommendations for specification changes to the secretary of the American Railroad Assn., who, in turn, gives them to AAR's tank-car committee for study. This committee, made up of manufacturers and railroad people, in effect has final say on the recommendation —though, on paper, the committee acts in only an advisory capacity to ICC.

There are three factors that figure to defeat the proposed changes in tank-car specifications: (1) they probably wouldn't prevent accidents such as the one at Metal Cladding, (2) the changes are not warranted in light of the rarity of this type of accident, (3) the changes might actually be the source of more accidents.

On the first point, those who argue against the proposed changes can point to the accident itself, and show that it resulted more from the failure to heed common-sense safety practices than from faulty design of tank cars.

The accident report showed, among other things, that the workers were using a flammable solvent, that the solvent was in a 5-gal. steel can, that the workers used a steel ladder to descend into the tank car, that they did not have safety harness or rescue lines. In addition, they were using a portable light that was not approved by the Underwriters' Laboratory, and though they had an explosimeter with them, they last used it two hours before the explosion occurred.

Too, there was a 6-in. exhaust pipe —not grounded—connected to a blower mounted on top of the tank car. Instead of protruding all the way into the tank car, the pipe was hanging inside the conning tower. Incoming fresh air, instead of going into the tank, was sucked into the exhaust pipe. This fact, more than any other, drew critical comment on the state's report of the accident.

Added to these errors, a third man, who was supposed to be stationed outside the tank, was not even near the tank car. The explosion hurled both inside men to the side of the tank car, and blew the steel ladder out of the conning tower over the roof of a building almost 100 ft. way from the tank car. When the men were finally taken from the car, both were dead of asphyxiation.

The National Safety Council when queried had no specific record of this type of accident, said it's not even sure whether this type of accident is lumped under railway vehicle accidents or asphyxiation. It added that such accidents must be exceedingly rare or they'd be broken down under their own classification. Harry Campbell, director of the Bureau of Explosives, was also approached on the matter of frequency of this type of accident, said as far as he knew, they were "extremely rare." It was also his opinion that more manholes would be just another source of danger.

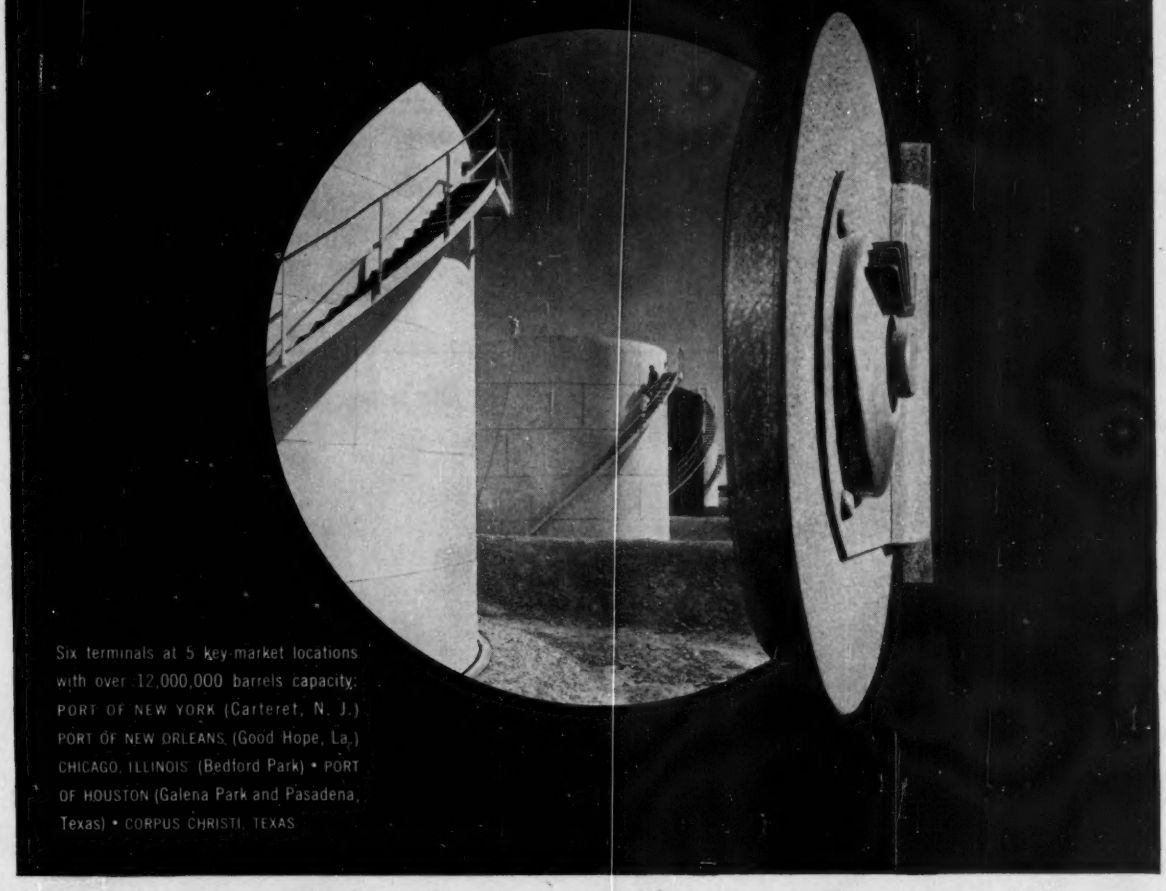
This latter point, the cure being worse than the disease, was echoed by others. A spokesman for American Car and Foundry, the tank-car manufacturer, commented that even the present 16-in. manhole has caused some difficulty in the past, that reinforcements were occasionally necessary. With larger manholes this difficulty would be compounded. Another consideration: fact that pressure-type cars would be almost impossible to fit with three domes.

Mechanical difficulties aside, there's the problem of cost. If the changes did go through, and present tank cars were required to have three manholes, it would mean a whopping bill for someone. There are approximately 150,000 tank cars in the U.S., 35,000 in chemical service. CHEMICAL WEEK asked several tank-car fabricators for an estimate on what the proposed changes would cost. Their answer, remarkably similar — approximately $3,500 per car.

The debatable nature of the proposed changes and the costs involved indicate a turndown by ICC.

how to keep a

MULTI-MILLION-DOLLAR SECRET



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Headwaters for Statistics

"Statistics given the government by the chemical industry are conscientiously prepared." That's the key finding in a new survey of industry practice in the preparation of governmental chemical statistics forms.

Sponsored by the Chemical Market Research Assn., the poll shows the technical departments — production, market research, sales and others— completely prepare, assist in preparing, or review more than two-thirds of the forms.

Twofold aim of the CMRA survey:

- To learn who prepares and reviews government questionnaires on chemical statistics.
- To spur interest in the accuracy of information supplied to federal agencies.

Questionnaires were mailed to 147 individual members of the association, each representing one company or an autonomous division of the firm. Foreign concerns and chemical consultants were excluded from the survey. The response: 61%.

The results *(box, p. 81)* indicate that 67% of the forms are completed by the accounting or financial departments. Of these, some 47% are compiled with the help of technical departments. Apparently, some 31% of the queries are prepared without the

Larger Tanks, Larger Market

PRODUCT APPLICATIONS for glass fiber-reinforced polyester plastic are getting bigger all the time. One example: chemical processing tanks. Recently, Haveg Industries, Inc. (Wilmington, Del.) fabricated a tank 15 ft. in diameter by 18 ft. in length, with a capacity well over 20,000 gal. Still larger units are expected to be built in the near future. Construction materials can be varied (e.g., substituting nylon for glass fiber) to cope with such corrosion problems as attack by oxidizing acids and organic solvents.

The tanks are being made available in a variety of sizes, can be fabricated at the point of use or in the molders' shops.

Government Questionnaires: Who Answers Them?

Department	Percent
Accounting	56
Production	11
Market Research or Development	11
Controller or Financial	11
Sales	7
Other	4

aid of technical assistance. Some 43% of the CMRA members (or their staffs) answering the questionnaire checked information for nomenclature, bases and figures. In contrast, some 49% of all those replying (CMRA members or not) revealed that at least one user of government information in their companies scrutinized completed forms before forwarding them to govment bureaus.

Although the results indicate that data is checked by the most qualified company department, room for improving accuracy exists. Many of those surveyed stated that the definitions of chemical classification—especially those of "in process" and "intermediate" chemicals—should be clarified. Despite this shortcoming, however, CMRA's statistics committee believes that the survey proves that the chemical industry is doing a good job in providing the government with reliable information.

•

Coal Movie: The chemistry of coal is the subject of a new, 23-minute color film, "The Waiting Harvest." Filmed by United States Steel Corp., the movie outlines the history of cokemaking, shows how combustion vapors are converted into useful chemical materials. Animated flow charts are used extensively to illustrate the processes.

The film also reviews the record of accomplishment in making chemi-

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Like more information or technical help?

Simply call your nearby DIAMOND representative. Or write DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.

Diamond Chemicals

cals from coal, suggests possible future developments, and portrays the use of coal chemicals in many types of products.

COMPETITION

• Enjay Co. is forming a new sales division to service petrochemical sales in the Mississippi Valley from the Great Lakes to the Gulf, and west to the Rocky Mountains. Offices will be located in Chicago, Tulsa and Akron.

• Phillips Chemical Co. is opening six district offices for its plastics sales division in preparation for major polyethylene marketing efforts. Locations: Pasadena, Calif., Elmhurst (Chicago), Ill., New York, Akron, O., Providence, R. I., and Bartlesville, Okla. Additionally, a sales-service laboratory is being built in Bartlesville.

• Rhodia, Inc. (New York) has designated Commerciale Reka S. A. (Mexico City) as sales and technical representative for synthetic aromatic chemicals in Mexico.

• American Mineral Spirits Co. has opened a new storage terminal for solvents in Baltimore.

• Dow Chemical Co. is establishing a Wood and Construction Section in its technical service and development group. The new section will handle sales service for chemicals used in the wood and construction fields, be responsible for developing new applications.

• Colton Chemical Co. (division of Air Reduction Co.) is enlarging its Chicago district territory to include Minneapolis, St. Paul, Kansas City, St. Louis and Wichita.

• Alkydol Laboratories, Inc. (Cicero, Ill.) has appointed Harwood J. Cranston (Sewickley, Pa.) as manufacturer's representative for the northern West Virginia, western Pennsylvania and eastern Ohio area.

DATA DIGEST

• **Polyvinyl Chloride:** 8-p. bulletin gives information on the use of rigid, unplasticized polyvinyl chloride compounds in manufacture of pipe and fittings. Goodrich Chemical Co. (Cleveland).

• **Radiochemicals:** Catalog and price list of carbon-14, tritium and deuterium compounds. New England Nuclear Corp. (Boston).

• **Beryllium copper:** 4-p. folder gives engineering specifications, heat-treating method data and age-hardening graphs for beryllium copper. No. A-300. American Silver Co. (Flushing, N. Y.)

• **Microprint publications:** Catalog lists chemicals and other literature available on microprint cards. Eastman Kodak Co. (Rochester).

• **Resin dispersions:** 16-p. brochure describes the properties of Dresinol resin dispersions and use in conjunction with GR-S latex in enamel felt base, carpet sizes, adhesives and linoleum sealer coats. Hercules Powder Co. (Wilmington, Del.).

• **Formaldehyde:** Bulletin offers detailed information on physical and toxicological properties of the material. Potential applications and handling techniques are also described. Heyden Chemical Corp. (New York).

• **Ion-exchange catalysis:** 12-p. brochure delineates use of exchange resins as catalysts in esterification, epoxidation, hydration, and aldol condensation reactions. Permutit Co. (New York).

• **Safety data sheets:** Fact sheets give tips for safe handling of anhydrous aluminum chloride and toluene. Manufacturing Chemists' Assn. (Washington, D.C.).

• **Hydrogen peroxide:** Wall chart gives safety rules for handling and storing hydrogen peroxide. Solvay Process Division, Allied Chemical & Dye Corp. (New York).

• **Chlorine and caustic soda:** Wall charts offer suggestions for the safe handling of chlorine and caustic soda. Olin Mathieson Chemical Corp. (Baltimore).

• **Urethane foam:** Brochure outlines applications of foams in wide variety of products. Mobay Chemical Co. (St. Louis).

• **Calibrated color pastes:** Bulletin gives information on thermal and light stabilities, migration and crocking, alkali resistance and relative strength properties of color pastes. Claremont Pigments Dispersion Corp. (Roslyn Heights, N.Y.).

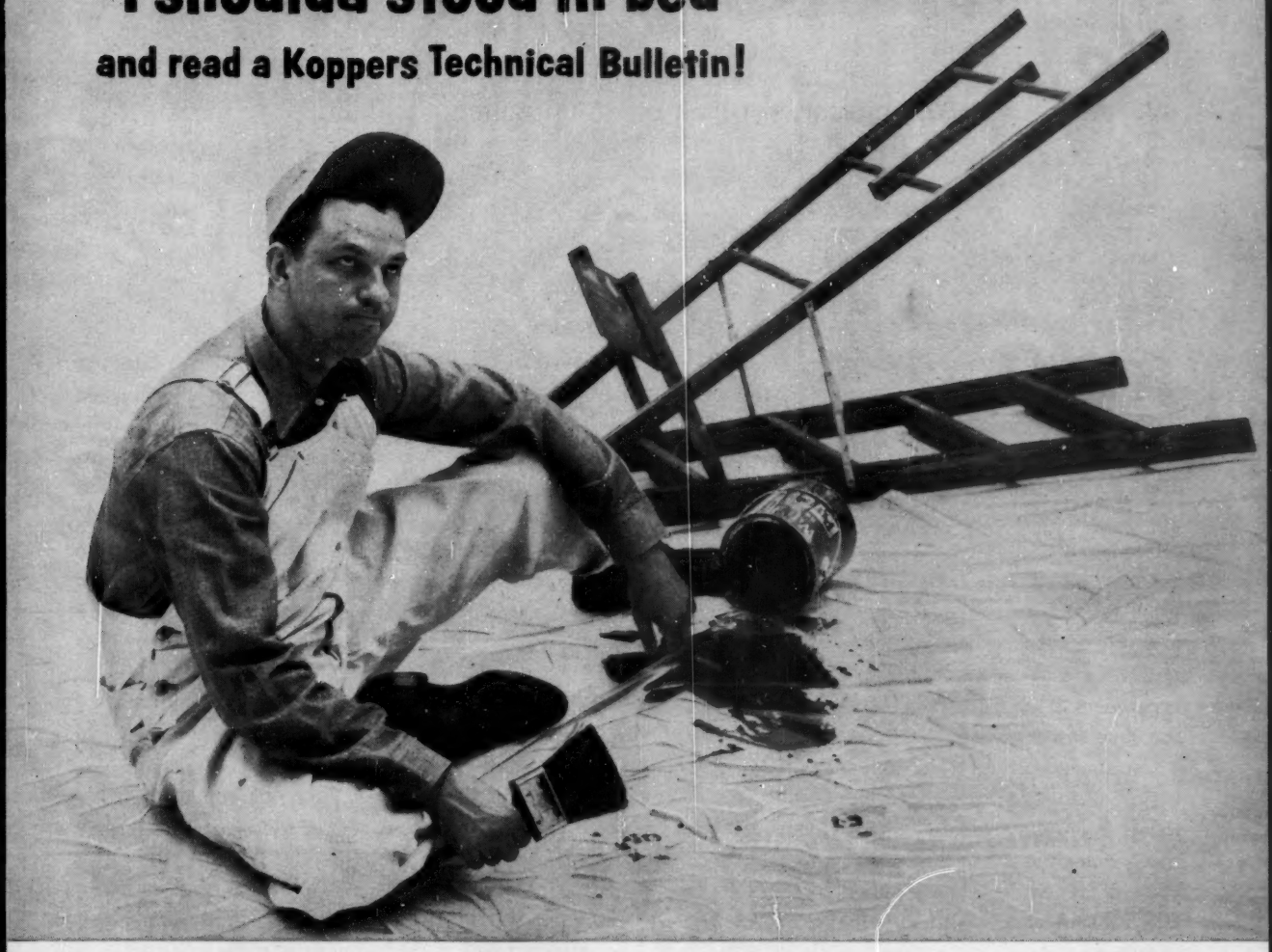
Available from the Small Business Administration, Washington, D. C.:

• **Naphthalene:** 5-p. brochure gives data on plant capacity, production and product grades. BSB 152, 10¢.

• **Commercial salesman training:** Lists federal and nongovernment publications, periodicals and associations of interest to industrial sales management. BSB 148, 10¢.

I shoulda stood in bed

and read a Koppers Technical Bulletin!



I tried to do everything right. I bought some excellent pastel paint with alkyd resin made from Koppers extra-pure, extra-clear phthalic anhydride.

Next, I asked for a paperboard box, made water-resistant with an adhesive based on Koppers resorcinol. (The box was to store paint in, in my cellar, and it had to be water-resistant in case of flood.)

In case there *was* a flood, I bought me a pair of shoes treated with Bavon 66® leather-treating compound which makes leather 250 times more resistant to water than if left untreated.

Then came a drop cloth of polyethylene which contained, as does any wise sheet of polyethylene, a small amount of **dbpc** antioxidant to give it light stability.

My equipment complete, I mounted my ladder. But unbeknownst to me, my ladder was coming apart at the seams. I had left it out in the rain, and now it collapsed. Me, with it. All because I had not read enough Koppers Technical Bulletins. You see, "old soggy" hadn't been bonded with waterproof Penacolite® Adhesive (the best there is and made by Koppers, of course).

Don't *you* get caught, as I did, with incomplete information about Koppers chemicals. Send the coupon, and learn how Koppers can help you if your business is food, petroleum products, paper, rubber, paint, plastics, boats, paperboard, animal feed, plywood, dye, pharmaceuticals, cosmetics, shoes, insecticides.

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RARE EARTHS AS CATALYSTS

An application which offers intriguing possibilities

a report by LINDSAY

Ever tried to burn a cube of sugar? It can't be done, you know—unless you use a catalyst . . . in this case cigarette ashes. Dust the cube with ashes, apply a match and presto—you have a junior inferno.

Of course, you're not vitally interested in burning cubes of sugar—aside from amazing your non-technical friends. We mention this little experiment to focus attention on the use of rare earths as catalysts.

Cerium and cerium oxide are being used for this purpose in several industries. And it is highly probable that among the other rare earths, you will find some that have important commercial possibilities in your operations.

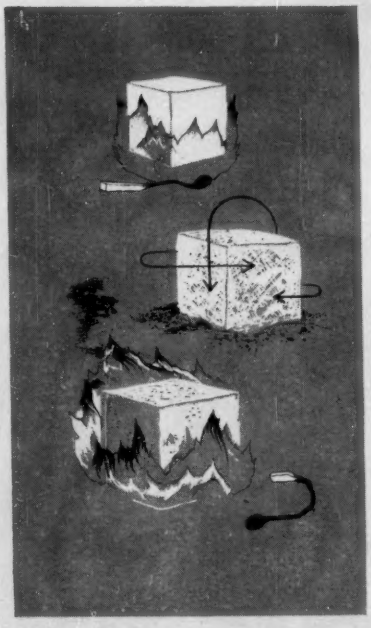
Interest in the rare earths as catalysts is gaining momentum. Although we, at Lindsay, do not make catalysts ourselves, we do supply rare earth materials for this use. Here are some of the operations where rare earths may have a place in your industry. *Ammonia Synthesis and Oxidation, Combustion and Oxidation, Dehydration, Dehydrogenation and Hydrogenation, Fischer-Tropsch Reaction, Halogenation, Methanol Synthesis, Polymerization, Crude Oil Cracking, Paint Driers.*

If any of these processes play a part in your plant operations, you may find it richly rewarding to investigate rare earths as catalysts.

This is only one of the many, many applications of these unique metals. Here at Lindsay, we have been refining and developing rare earths for over 50 years and almost every day we hear of new uses for them. Scientists in more and more industries are turning to the rare earths in their search for ways to improve their products and processes.

Take Lindsay's cerium oxide, for example. It has revolutionized glass polishing practices and is also used in colorizing and decolorizing glass.

Lindsay's rare earth chloride (a natural mixture of the chlorides of cerium, lanthanum, neodymium and praseodymium and some other rare earths) is used extensively in the textile industry, the metal industry and in the manufacture of paint and ink.



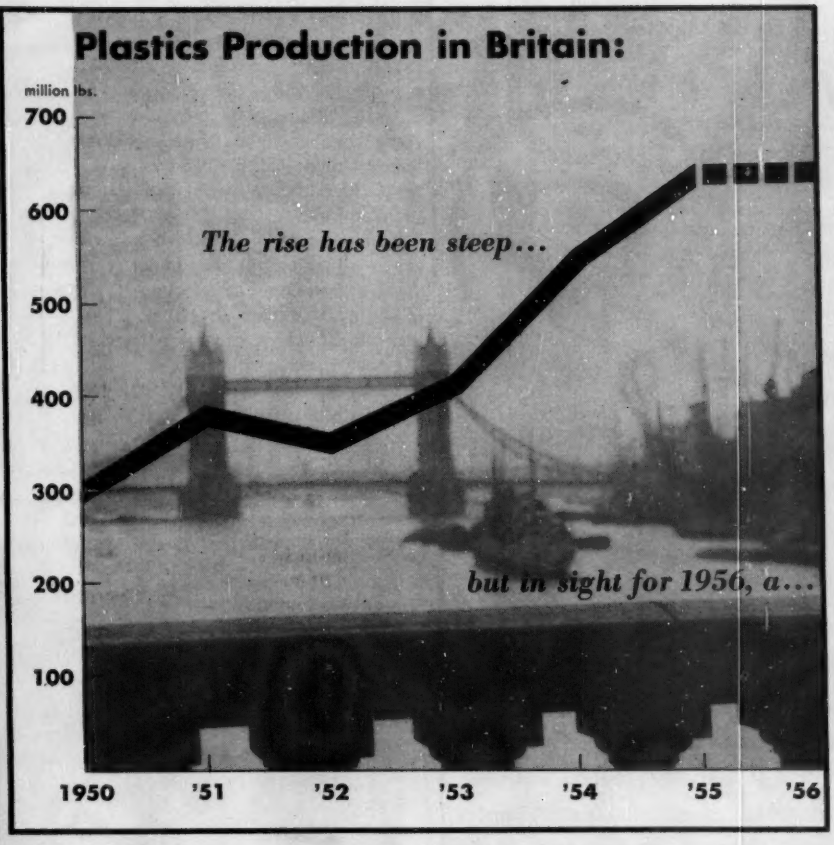
You'd be surprised at the diverse uses of rare earths in today's industrial technology. It seems as if every time you turn around, some researcher has found a new and practical application for one or more of these amazing metals. That's why we would like to suggest that you look at the rare earths with an eye toward their use as catalysts in your operations.

Some technical people have tended to overlook the rare earths, believing them to be unavailable in commercial quantities. This is not true. Lindsay is engaged in large scale production of cerium, rare earth and thorium chemicals, and offers them for prompt shipment in quantities from a gram to a carload.

To aid you, the accumulated data and the advice of Lindsay's technical staff is at your service. Your inquiry is invited.

PLEASE ADDRESS INQUIRIES TO: LINDSAY CHEMICAL COMPANY

270 ANN STREET, WEST CHICAGO, ILL.



Pause at a Record

Booming plastics activity is by no means confined to the U.S. In Britain, for example, production of plastics and resin materials has risen more than 53% in the past year, and so far this year shows a slight increase over '55's 648-million-lbs./year clip. This output is small, of course, by American standards*, but the rapid rise is keeping U.S. marketers alert to plastics developments in England.

All is not rosy in Great Britain's plastics industry, however. There is some trepidation among market followers that output during the third quarter may fall below last year's level for the same period. The setback, if it occurs, will likely keep total '56 production somewhere near last year's quantity.

The reason for this can be traced to the current recession in British consumer goods industries; and the reduction in plastics demand has been widespread. Orders for plastics materials for film-making, sheeting and molded products have fallen; requirements for cables and other electrical insulation purposes have not shown the sharp increases noted in previous years. Down, too, are demands for plastics from English motor, radio, and domestic appliance industries. As car production goes down, for instance, so does production of polyvinyl chloride "leathercloth," and a wide variety of other plastic automotive components, including dashboard panels, convertible hoods, horn buttons, switches, and the normal range of electrical equipment. Cutbacks in the radio industry have lessened demand for plastics cabinets and other plastic items such as plug-sockets, valve holders, and insulated wire.

But the present situation isn't more than a temporary pause in the British plastics industry's impressive climb toward the "big time."

Polyethylene, for one, continues to maintain a spectacular growth rate. Output last year from Imperial Chemical Industries, the sole producer in England, was a hefty 60-70 million lbs. Early in '57, ICI expects to complete a new plant that will boost its capacity to almost 114 million lbs./year, nearly triple the firm's 1953 capability. And there's more polyethylene in sight:

- Union Carbide is building a 23-million-lbs./year plant at Grangemouth costing $12 million.
- Just a few weeks ago, Monsanto Chemical revealed its intention to build a polyethylene plant on a site adjoining the Esso oil refinery at Fawley near Southampton. (Monsanto isn't saying anything about initial size of the new installation, but trade talk has it that the plant will be somewhat larger than Union Carbide's Grangemouth project.)

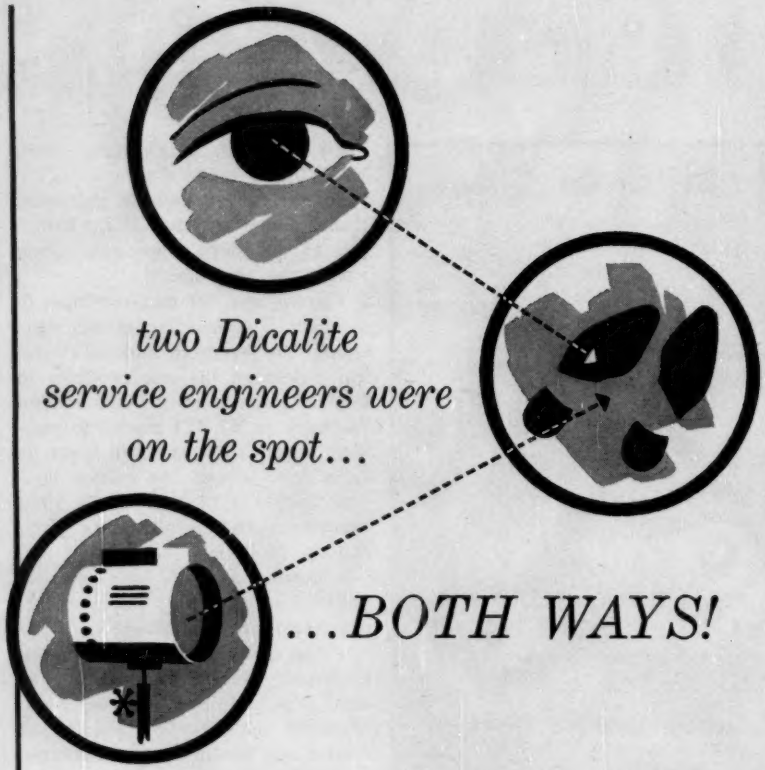
PVC Outlook: Perhaps hardest hit by the current slackening in plastics consumption in Britain is polyvinyl chloride. Trade observers will not be too surprised if '56 PVC sales are considerably under '55's. And Britain's PVC production curve may indeed emulate that downward pattern, dip below last year's mark of 100 million lbs.—a direct contrast with the climb from '54's 80 million lbs.

But PVC is also being buffeted by factors other than the slowing domestic demand. Reports are that the plastic's market condition has been aggravated by the arrival of considerable tonnages of the material from Canada and Italy with price tags well under those quoted by British makers.

Despite the present dark areas in the PVC picture, however, British producers are optimistic about the longer-term view—a deduction made obvious by the country's capacity expansions.

ICI's new installation at its Hillhouse plant, for instance, will bring the firm's PVC-making potential to some 80 million lbs. by the end of this year. British Geon (the Distillers' subsidiary) recently doubled its capa-

*U.S. output hit nearly 3.6 billion lbs. in '55, is expected to come closer to 4 billion lbs. this year.



two Dicalite service engineers were on the spot...

...BOTH WAYS!

This problem was a little different from those usually met with by Dicalite's technical service men. A large oil company, working on a new oil additive, had asked if our service engineers could aid in improving an unsatisfactory filtration. So far, an everyday situation. But when the two technical men arrived at the refinery, they found that the importance of the new product had drawn observers from all parts of the company and even from other firms, all deeply interested in the results. It was almost like working in a spotlight.

However, our service engineers produced the answer. They made Dicalite bomb filter tests on the spot, balanced the factors of clarity, throughput and costs. They were then able to recommend a Dicalite filteraid which, in the oil company's own words, "gives us higher clarity and better economics."

While not routine, this is typical of the work of Dicalite's technical service men. They will either work with you in your plant or enlist the services of the Dicalite laboratory to help solve the problem. One way or another, Dicalite answers, each month, scores of such problems—and will be delighted to help you with yours. Just write us.

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city to about 54 million lbs./year.

Add Bakelite's estimated 10 million lbs. of PVC capacity (at Aycliffe) and it's apparent that Britain will step into 1957 with a good-size surplus. But, insist industry spokesmen, this new capacity "will soon be employed."

In the case of polystyrene, however, there is probably already a considerable "underemployment" of capacity. The new high-impact-grade polystyrene plant completed by Monsanto late last year upped total British capacity to an estimated 60 million lbs./year. According to some late estimates, this is about 20 million lbs. greater than the rate at which annual production has been running.

Industry Breakdown: Last month the British Board of Trade's new

Pest Project: Sprinkle

A NEW SOIL FUMIGANT is now ready to make a strong competitive bid for part of methyl bromide's 2-million-lbs./year soil treatment market (*CW, Aug. 20, '55, p. 83*). Tradenamed Vapam*, it's water-miscible sodium methyl di-

*The fumigant was developed by Stauffer Chemical, tested for 3 years at the Louisiana Agricultural Experiment Station, and is now marketed by Du Pont.

statistical series on plastics* indicated the roles played by thermoplastic and thermosetting materials in pushing '55 production to more than 16% above the previous year's level.

Thermoplastics, the report points out, continue to account for the major part of this expansion with output up 21% over the '54 figure. In 1955, the rate of thermoplastics production exceeded that of thermosetting materials for the first time (though polystyrene output fell off).

The two chief thermoplastics, polyethylene and PVC, aren't listed separately in the Board of Trade's statistics, but the miscellaneous group in which

*Figures are compiled from returns submitted by 160 British firms; do not include synthetic rubber or plastics materials for use in manufacturing synthetic fibers.

Sterilization

thiocarbamate. It can be sprayed with a sprinkling can, hose proportioner, or overhead sprinkler.

The new material combines ease of application with effective action against weed seedlings, soil insects, fungi, nematodes; it's recommended for many types of crops, e.g., vegetables, tobacco (*see above*), flowers, lawns.

When the ammonium nitrate prilling plant in the background, above, is shut down for maintenance, the production of 83% and 95% ammonium nitrate solutions from nitric acid continues. This is possible because of the storage facilities offered by the 25,000-bbl. Horton® stainless steel tank in the foreground. The ammonium nitrate stored in the tank is used when the prilling plant is returned to operation. The tank can also be used for storing 5,000 tons equivalent ammonium nitrate to be prilled during high demand season.

The Horton stainless steel tank, built for the Mississippi Chemical Corporation, Yazoo, Miss., is expected to pay for itself quickly by helping to increase considerably the company's production.

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they are incorporated showed a 34% increase to nearly 157 million lbs. The advance of other materials during the same period, adds the board, was substantially less.

Increases in output of thermosetting materials during '55 were also generally less spectacular than they had been in previous years. The standout: casein plastics. These enjoyed a 30% jump in output, but represent only a small proportion of the total.

Production of phenolics and cresylics, accounting for nearly 45% of the thermosetting group, increased 15%, helped to push total '55 production of the group some 12% higher than in 1954.

Export High: The government survey also indicates that 1955 was a record year for British exports of plastics. Total amount of these exports (resins, molding powders, sheet, rod, tube, film and foil) hit almost 170 million lbs., worth about $64 million —some 22 million lbs. and $7 million more than the previous record figures reached in '54. (These data, of course, do not include the substantial amount of "indirect exports" in the form of finished goods and components.)

It's unlikely that the plastics industry in Britain will ever achieve the towering stature of the U.S. multibillion-pound business with its unlimited raw materials and fast-expanding nearby markets. But this much is certain: despite the dip in sales and production anticipated for the last half of '56, the British plastics industry will recover and pick up speed in the climb toward its first billion pounds a year.

C W Report

Next Week

CW analyzes the $10-million upstart chemical process industry based on seaweed. Despite acute harvesting mechanization problems, recent technological developments augur well for seaweed colloid producers and users.

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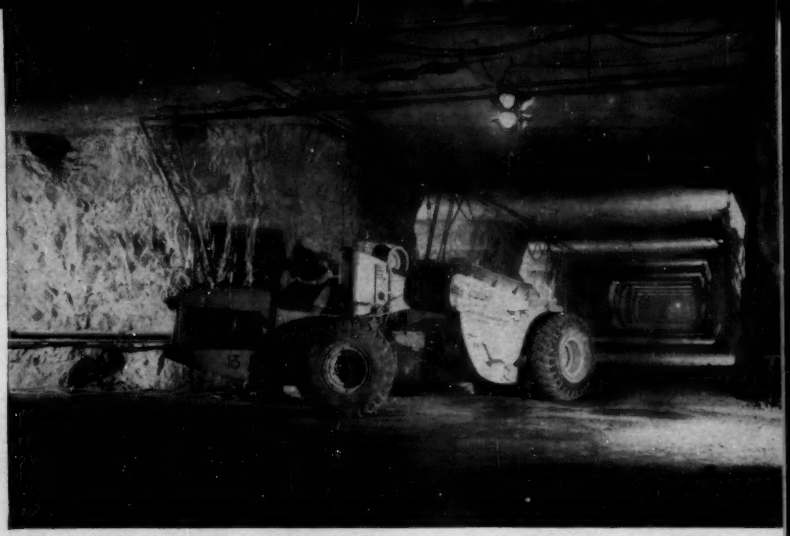

RAW MATERIAL SUPPLY IS DEPENDABLE. Lime is a major raw material in the manufacture of soda ash. Columbia-Southern obtains its limestone from miles of underground mines located almost beneath its Barberton plant. Columbia-Southern also operates its own salt wells and coal mines.

For over half a century, Columbia-Southern has been supplying quality soda ash to American industry.

However, in addition to the high quality of product, such things as raw material supply, plant facilities, location, service and personnel of Columbia-Southern are also important to you as a soda ash user.

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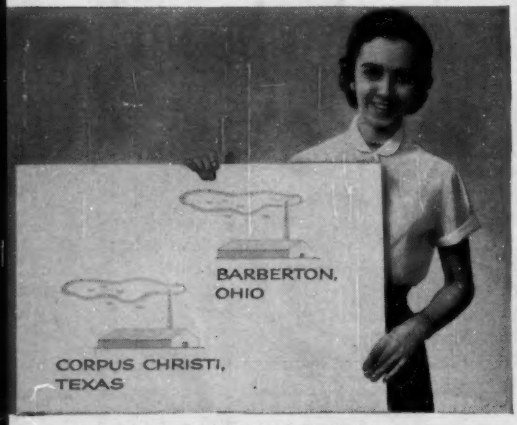

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SERVICE IS SUPERIOR. Your order always gets immediate and meticulous attention. Members of Columbia-Southern's technical staff are always ready to give assistance on your soda ash problems.

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IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

Market
Newsletter

CHEMICAL WEEK
July 14, 1956

A government subsidy program to keep a floor under prices of domestically mined acid-grade fluorspar, tungsten, asbestos and columbium-tantalum until 1959 is on the way. The new program—latest in the long series of "stop gap" schemes to underwrite domestic metal miners (*CW Market Newsletter, March 31; April 21; May 19*)—came out of the House Interior Committee last fortnight.

Once the House grants its expected approval, the bill goes to the Senate; odds are that the Senate, too, will favor passage of the bill as a substitute for an earlier version it cleared in June.

An Eisenhower veto is still possible, of course, but is highly doubtful in view of the last-minute changes written into the bill to meet Administration objections. Here's what the new plan provides:

Four minerals will be purchased from domestic producers by the General Services Administration—under rules set by the Dept. of the Interior—at prices and in amounts set by the law; in all, the government expects to pay out $91 million to prop the four minerals, which GSA will put into government stockpile.

These quotas and prices will govern U.S. purchases for the life of the program—from now until Dec. 31, '58:

- Acid-grade fluorspar: 250,000 tons at $53/ton, paid at the mill.
- Tungsten: 1.25 million ton units at $55/ton, with a limit of 5,000 ton units from any one producer in any one month.
- Asbestos: 2,000 tons of grades 1 and 2 and 2,000 additional tons if grade 3 is delivered along with 1 and 2, at the market price.
- Columbium-tantalum: 250,000 lbs. at the GSA price schedule for Dec. 31, '55—which ranged from $1.40 to $3.50/lb., depending on the grade. (This provision was put in the bill to give producers added assurance against failure, but no government purchases are anticipated, since the stockpile goal for this mineral has been reached.)

Under the new law, acid-grade fluorspar and columbium-tantalum will come in for government price support for the first time. Both tungsten and asbestos are carried forward from the soon-to-expire 1953 Minerals Purchase Act.

There'll be continued support for seven other minerals now being bought with stockpile funds under the '53 act administered by the Office of Defense Mobilization.

ODM Director Arthur Flemming has already made good on part of his pledge to continue relief, through administrative means, by extending the program for the following items:

- Metallurgical chromite: to June 30, 1959.
- Mica, muscovite block and film: to Jan. 30, 1962.

• Beryl: to June 30, 1962 (with a hike in the purchase quota from 1,500 to 4,500 tons).

• Metallurgical-grade manganese: to Jan. 1, 1961 (with a boost in the quota from 19 million to 28 million long-ton units.

Similar relief is pending for producers of metallurgical-grade fluorspar, antimony and mercury.

•

Completion of a new pentachlorophenol plant at Tacoma, Wash., boosts Reichhold's total capacity by 12-15,000 lbs./day. (The product is already produced at the firm's Seattle plant) All or most of the output from the semi-automatic unit will compete with creosote as a wood preservative.

Reichhold has also revealed that another unit at the Tacoma plant, onstream since April, is now making plywood glue, has a capacity of 100,000 lbs./day.

And in the planning stage: further expansions of the firm's formaldehyde and resin production.

•

There are a right way and a wrong way to go about borrowing the government's overseas pesticide reports on individual countries (*CW, June 23, p. 72*).

The wrong way is to call the Business and Defense Services Administration and ask to borrow the entire batch. Reports on only a few countries can be loaned at one time to any one firm.

The right way: make your request—by letter—to BDSA's Chemical Division in Washington or to the nearest Dept. of Commerce field office, but don't ask for too many; or you may inspect them at the Washington office of BDSA's international consultant, C. C. Concannon.

•

Price reductions ranging from 5% to 20% on silicone rubber stocks and gums have been posted by the Silastic Sales Division of Dow Corning.

New tabs on 5,000-lb. lots: Silastic 161, $1.90; 7-170, $2.90; 7-181, $2.75; 8-164, $2.95; 430 gum and 432 base now sell for $3.85 and $3.25/lb. respectively.

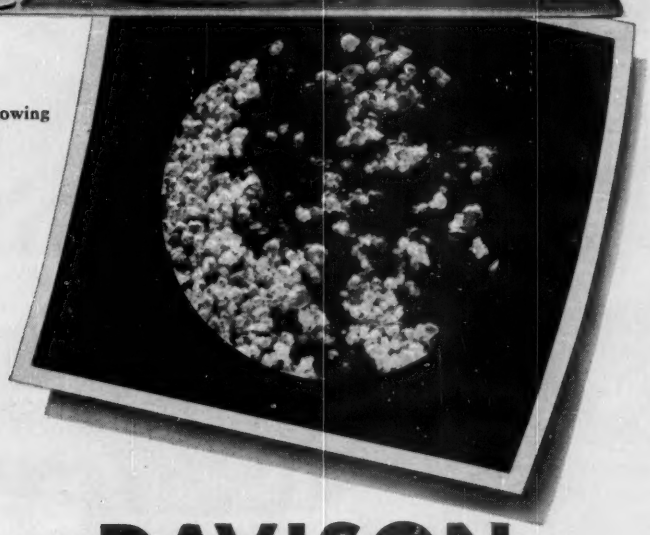
SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending July 9, 1956

UP

	Change	New Price
Ammonium phosphate, coml., bgs., wks., frt. equald.	$0.0025	$0.0925
Carbon tetrachloride, tks., frt. alld.	0.005	0.10
Formaldehyde, USP, 37%, inhibited, tks., dlvd.	0.002	0.042
Pentachlorophenol, dms., c.l., wks., frt. equald.	0.01	0.22
Trichloroethylene, tks., wks., frt. equald.	0.005	0.1125
Triethylamine, tks., wks., dlvd. E.	0.015	0.465

All prices per pound unless quantity is stated.

PROGRESS THROUGH CHEMISTRY



Microphotograph showing Davison's Hydrogel enlarged 20 times actual size.

DAVISON

...partner in product development

Davison Engineers have a long record of working with manufacturers in the development of new products as well as solving problems on products currently in production. One such case is the use of Davison's Code 91 Hydrogel for imparting porosity in rubber products. This application required a product of high purity with a narrow total volatile control. The particle size had to be of definite consistency and a close control of the pH range was required. Davison Engineers worked on the problem with the manufacturer and developed Code 91 Hydrogel which is being used successfully and economically to meet the rigid specifications.

This is only one of the many cases in which Davison Engineers have been able to help a manufacturer solve a problem.

See your Davison Field Service Engineer today and discuss your manufacturing problem with him. Let the Davison Engineer be your partner in product development.

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High Potential Chemicals Released for Full Commercial Development by New Celanese Aldol Production

Is there an organic chemical that's "perfect" for your processing but wrong in volume, purity, or price?

For polyurethane and alkyd resin producers, trimethylolpropane was such a material. They were sold on its superior properties but the price was too high; the supply limited. Celanese Aldol Production is changing the picture for trimethylolpropane and other chemicals shut off by similar obstacles.

Celanese aldoling is unique. Several aldol units have been combined into one compact installation. Specially developed processes are employed. Production depends only on Celanese-produced aldehydes.

Result: trimethylolpropane in continuous commercial quantities to satisfy every demand . . . in unsurpassed uniform purity . . . and at a price that makes it competitive in all applications. Methyl isopropenyl ketone and 3-methoxy butanol are other Celanese Aldol Products already available in volume. Additional chemicals are in the development stage.

If you would like complete information about Celanese Aldol Products—or if you have a special chemical need that Celanese Aldol Production may be able to fill—mail coupon or write to Celanese Corporation of America, Chemical Division, Dept. 552-G, 180 Madison Avenue, New York 16.

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Trimethylolpropane
3-Methoxy Butanol
Methyl Isopropenyl Ketone

In Development

Anhydro Enneaheptitol
1, 3-Butylene Glycol (aldol grade)

Celanese Corporation of America
Chemical Division, Dept. 552-G,
180 Madison Avenue, New York 16.

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☐ Methyl Isopropenyl Ketone

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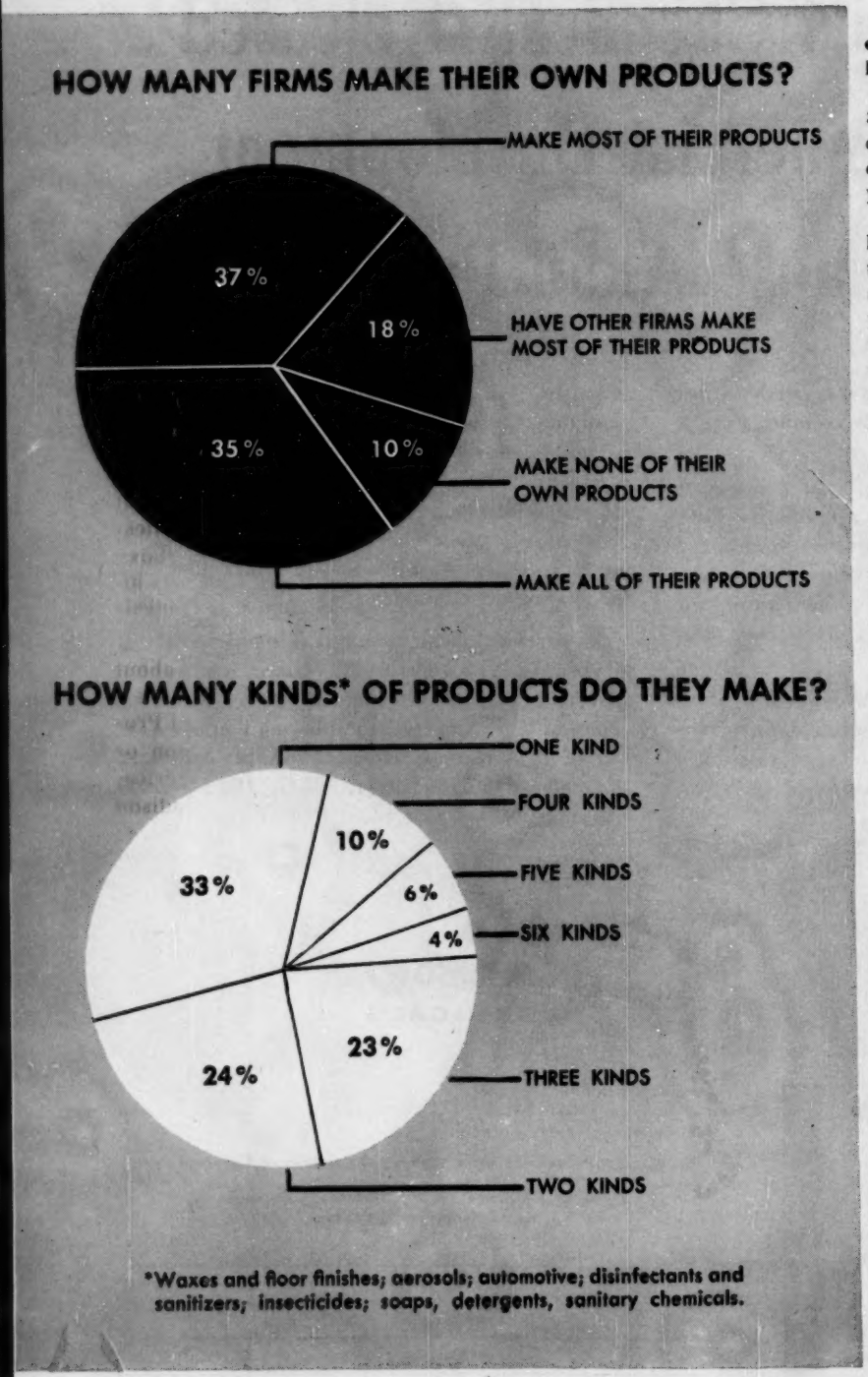
COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

Consensus: Bright Present, Brighte



CHEMICAL WEEK'S latest survey of U.S. specialties makers yields this heartening news:

- Sales in '55 were, in the case of 89% of the respondents, above those of the previous year; 6% see little change, 5% find sales slumping. Last year, about 81% reported rising sales.
- Nearly 76% of survey respondents have scheduled an increase in production facilities—the highest percentage among respondents in the past three years. The "expansion-minded" firms in '55 and '54 were 55% and 65%, respectively, of those that replied—and that included enlargement of facilities, product lines and personnel.

For these firms planning increases, the new facilities are estimated to boost capacity, on an average, by a solid 30%. Aerosol and insecticide makers have slated the largest expansions. And about 75% of the respondents figure on paying for their additional capacity with reserve funds; bank loans will finance most of the rest, with factoring and stock issues accounting for some 3% and 2% of expansions, respectively.

Who's Talking: Figures like these don't mean much unless you know exactly to whom they apply. You can sketch your own picture of the typical respondent from these details:

- **Products:** The survey covered six general product areas, areas defined by the Chemical Specialties Manufacturers Assn.: (1) waxes and floor finishes, (2) aerosols, (3) automotive, (4) disinfectants and sanitizers, (5) household insecticides, (6) soaps, detergents, sanitary chemicals.*

Most firms (66%) make products in several of these classifications: 33% make the wax products; 40%, aerosols; 11%, automotive chemicals; 30%, disinfectants; 25%, insecticides; 56%, soaps (total is more than 100% because firms are classified in several categories).

As the graphs show, 33% concen-

*There's a change in classification this year from last—no paint or fertilizer manufacturers were queried this time.

Prospects

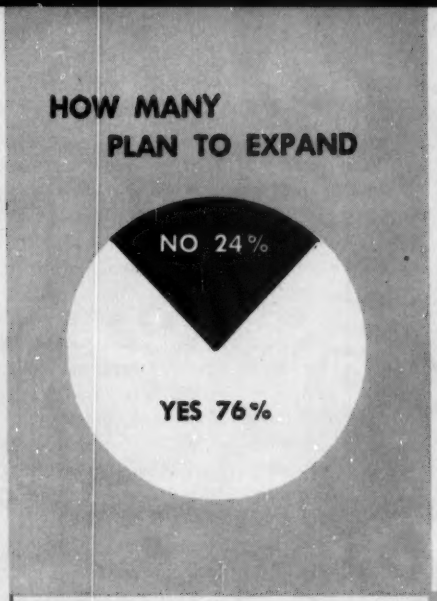
trate in one product area, 24% in two, 23% in three, and 20% in four to six areas. Almost a third of the larger firms replying, however, and also many smaller firms, concentrate on just one type.

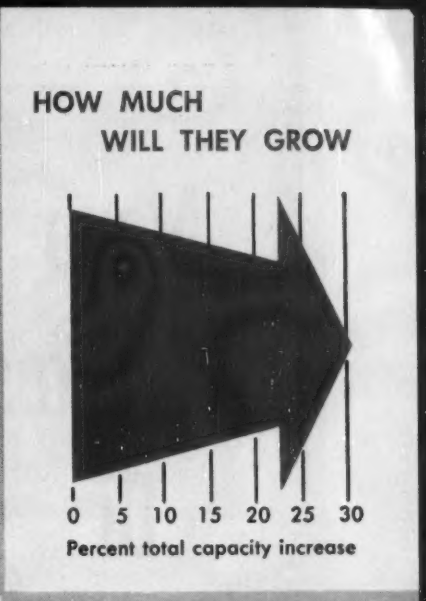
- **End-User:** The firms checked make their product for retail (17%), wholesale (24%), industrial (38%), or consumer (21%) outlets—and more than half (55%) supply several outlets.
- **Size:** About half of the respondents to *CW's* survey (46% of 87) do a business (at manufacturer's level) of $3 million or greater; 15% of them, more than $2 million; 14%, more than $1 million. The remaining 25% is evenly divided between firms in the $100,000-500,000 range and the under-$100,000 category. In conservative estimate, the surveyed segment of the specialties business does $200 million worth of business yearly.
- **Make or Buy?** Thirty-five percent of the firms queried make all their own specialties. Generally, the larger companies (perhaps half) and about 15% of those with sales of under a million dollars make their own goods. As indicated on the graph, a generous third do "most" of their own manufacturing; another 18% let out a major share.

Amber Signal: In drawing up your picture of the typical specialties manufacturer surveyed, it's wise to know the limitations. Keep in mind, then, that those who replied to this survey are most likely the firms with a real interest in their industry—the cooperative type.

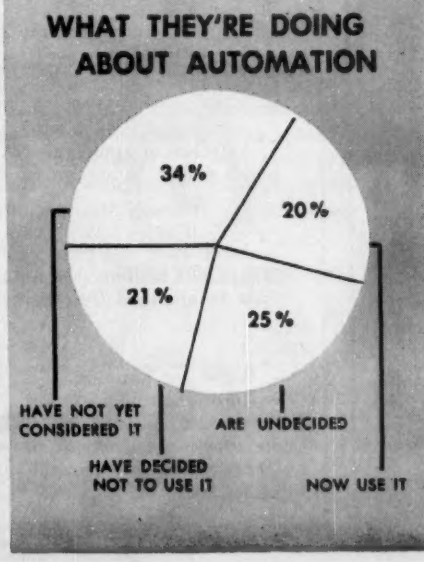
Bear in mind, too, that in a survey of this nature, those with advancing sales and those planning expansion are generally the most eager to tell about it. Examination of the "size" classification of respondents indicates that the firms that most readily replied are those with a fairly secure sales volume; they're at the point where they don't mind giving data.

Because the survey replies are not identified (the same basic lists are used





. . . IN THESE CATEGORIES
MANAGERIAL PERSONNEL
SALESMAN
PRODUCTION SPECIALISTS
SKILLED LABOR
0 5 10 15 20 25 30 35 40 45
Percent of firms reporting shortage



WHO'S REPRESENTED

Of the 87 firms included in this survey, more than 46% do $3-million-plus a year business at the manufacturers sales level. Another 15% did more than $2 mililon; and about 14% did better than $1 million. Twelve percent of the replies were from firms averaging $500,000 to $1,000,000 worth of business. The remaining 12% was evenly divided between firms in the $100,000-500,000 range and under. A conservative estimate of the total business done by the respondents is $200 million.

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each year), it's not possible to make exact comparisons from year to year, although over-all trends seem pretty clear.

Personnel Problem: As might be expected in an industry planning expansion, finding qualified personnel is a serious problem. Still, one of four survey respondents reported no difficulty in getting help. In the other balance pan, however, there's the fact that one out of five companies finds it hard to fill positions in every bracket, including managers, salesmen, production specialists, and skilled labor.

Getting salesmen is a major obstacle —41% of the firms have difficulty (*see graph*); company size seemingly has little bearing on the over-all problem. But size is of significance in getting production specialists—38% of the larger firms have trouble, but it bothers only 7% of the smaller outfits (likely because in small companies managerial personnel also handle production work). The larger firms are also more plagued with a shortage of skilled labor. One firm said its top problem is getting skilled secretaries and stenographers.

Unions, Bonuses: Because a company's relations with its labor force has an important bearing on the ease with which it gets help, *CW* probed this subject a little deeper along the lines of unionization, raise granting, and profit sharing:

- **Unions:** About 28% of the manufacturers surveyed are currently unionized—as might be expected, the larger plants have the greater percentage of organization. Over-all, about 30% of the unions are independents; the rest are affiliated with national labor organizations.
- **Raises:** Nearly all (80%) respondents granted general raises last year. Only in 14% of the cases was this under union pressure.
- **Profit Sharing:** One startling fact uncovered by the *CW* poll is that a whopping 42% of the firms have some type of profit-sharing plan. The percentage far exceeds the percentage of unionized plants. Generally, the large firms have formalized plans; the smaller specialties makers have bonus plans. (One firm's liberal policy: "No formal plan, but wages are increased by management when business increases, as computed quarterly.")

Automation: In a purposely vague question, *CW* checked specialties makers on "automation." As one respondent put it: "What's the dividing line between modern automatic manufacturing machinery and automation?" Frankly, *CW* wasn't prepared to draw this line, and left the definition up to those surveyed (*see replies graphed on p. 97*).

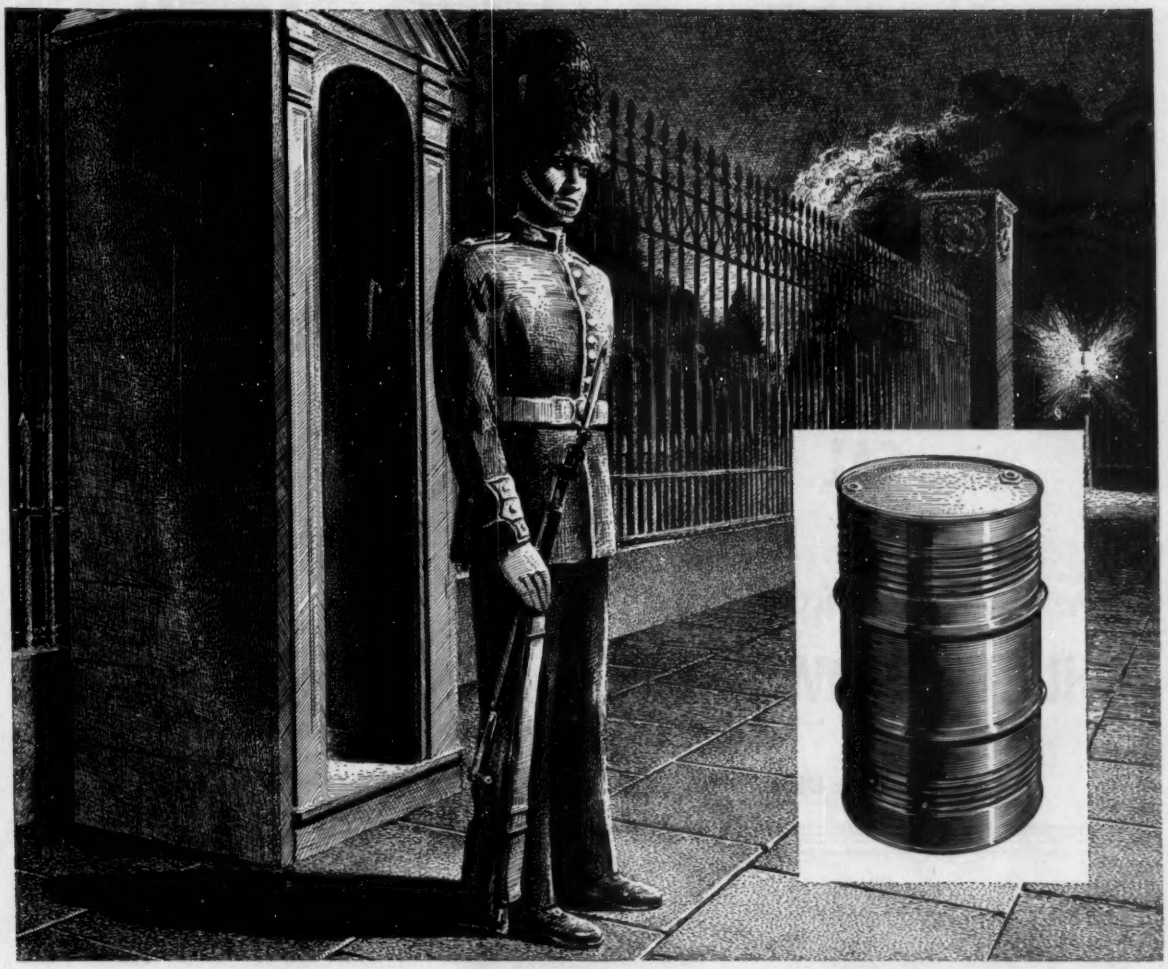
Apparently, most specialties makers consider automation to mean keeping equipment as modern and efficient as possible, rather than completely "robot." Many firms are convinced

Specialties Men Speak Out on Automation, Labor

'Automation applicable to my industry? Certainly,' answers one polish maker, 'it accounts for our 125% increase in capacity.'

'Automation is a term that has caught on and fascinates different groups and writers . . . Actually, it represents nothing new . . . it must be analyzed from many angles.'

'We're not unionized . . . we consider our wage increases merit and cost-of-living increases . . . For seven years [we have had] a guaranteed annual wage. We don't pay anywhere near the top of the range, yet 25% of our employees reporting on opening day [seven years ago] are still with us . . . only one man has been with us less than three years.'



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Care—a special kind of care—goes into the fabrication and finishing of every single USS Steel Drum. From selecting the right kind of rugged steel from our own mills, through the many processing steps of drum-making, until, finally, the component parts — spotless and gleaming — are ready for assembly . . . *care is the byword!*

A final step to insure product protection is the application of a special phosphate solution to the spotlessly clean and scale-free surfaces. The phosphate coating not only guards against contamination and rust, but provides ideal bond for external paint surfaces. This combination of careful workmanship plus quality materials means that your product's purity is completely protected—from the moment it enters a USS Steel Drum—until the drum is tapped in your customer's plant.

Make sure your products have the protection they need—always ship in USS Steel Drums. They are available in capacities from 2½ to 110 gallons. There are special fittings and openings for unusual needs.

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Texas Chemical Engr. Co., 4101 San Jacinto, Houston 4, Texas

that some phase of their formulation will always be manual operation—about 34% haven't even considered applying automation to their own lines; 21% have considered it, decided it isn't useful to their operations now.

Companies that expressed greatest interest in automation now are high-sales-volume, few-personnel manufacturers.

If anything, the answers to the question on automation illustrate the vigorous, progressive attitude of U.S. specialties makers. It's the same enterprise that has enabled them to once again boost yearly sales, and to plan even more production expansion.

Detergent Regulation?

U.S. synthetic detergent makers are giving worried attention to a report issued last week by Britain's Minister of Housing and Local Government. The report* examined the effects of the increasing use of detergents, suggested further research—and while this research is being done, it suggested that it might be wise to consider steps whereby the government could control syndet use, if harmful effects from its use seem apparent.

The Committee on Synthetic Detergents, which has been concerned with this matter since May, 1953, states that most syndet pollution problems will likely arise from household products discharged into sewage systems. Fearful of foaming problems, possible damage to plumbing systems, and possible ill effects to users of syndet-contaminated water, the committee suggested that:

- Methods of determining trace amounts of the detergents be worked out.
- Regular determinations of concentrations of surface-active agents be made—both at points where they are introduced into streams, and where water supplies are withdrawn. The public health departments would have access to these records.
- Checks be made on possible long-term effect on health caused by drinking syndet-containing water or by using crockery washed in detergents and not rinsed.
- Study be made on new ways of sewage treatment, to eliminate or bet-

*Final report, Committee on Synthetic Detergents, available from the Ministry of Housing and Local Government, Whitehall, London SW 1; price: 3 shillings.

(Advertisement)

CHEMICALS OUTLOOK

July, 1956

This news bulletin about Wyandotte Chemicals services, products, and their applications, is published to help keep you posted. Perhaps you will want to route these and subsequent facts to interested members of your organization. Additional information and trial quantities of Wyandotte products are available upon request ... . may we serve you?

NEW LOW PRICES FOR QUADROL

Now you can buy Quadrol,* Wyandotte's new polyol, at substantially lower prices -- in tank-car, carload, truck-load, mixed-car, and drum quantities. The price schedule now ranges from 48¢ per pound in 55-gallon steel drums, to only 40¢ per pound for tank-car orders. Rapid commercial acceptance, with resultant production increase, makes this reduction possible.

Chemically described as N,N,N',N'-tetrakis (2-hydroxypropyl) ethylenediamine, Quadrol is a water-white, viscous liquid of exceptionally high purity. Because it has six chemically reactive centers, Quadrol is a versatile chemical intermediate ... can chelate metal ions in solution ... stable complexes with copper and titanium have already been reported.

QUADROL HELPS PRODUCE RIGID POLYURETHANE FOAMS

Quadrol is finding increased commercial use in rigid polyurethane foams. Its four hydroxyl groups make it a highly effective cross-linking agent. It also accelerates the curing rate of other catalysts. In addition, Quadrol is especially suitable for polyurethane use because it is colorless, water-soluble, and has a high boiling point. Quadrol has a high degree of purity, and contains less than .1% water.

With Quadrol as the cross-linking agent, rigid polyurethane foams which are tack-free in 10 minutes, and have a density of 2 lbs./cu. ft., have been prepared. Up to 85% closed-cell structure may be obtained using Quadrol. Rigid foams prepared from Quadrol have a high tensile strength.

If you'd like to evaluate possible applications of Quadrol, write for technical data and samples on your company letterhead. (For example, the unique structure and physical properties of Quadrol suggest use in the preparation of emulsifying agents, surface-active agents, adhesives, pharmaceuticals, herbicides, fungicides, insecticides, and plasticizers.)

*Reg. U.S. Pat. Off.

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ter remove detergent contamination.

• Manufacturers of the washing compounds be urged to devise products that will oxidize or be removed more easily than are present materials.

The majority of the committee drew attention to the fact that ways of regulating synthetic detergent use are now lacking, and that a worsening of the situation might create a need for such regulations.

•

Citrus Test: Possible substitute for biphenyl fungicides in citrus fruit packing has been worked out by the University of California's Riverside, Calif., experiment station. Not precisely identified, but described as a mixture of salts producing ammonia gas when moistened, the agent can be used in pellet form, or as an impregnant for paper crate-liners. It appears to leave no residual odor, such as biphenyl does. The compound is still under tests.

PATENTS

Antifire: Here are some new fire-fighting materials.

• Charles Anthony, Jr., and Robert Thoman have worked out a pair of liquid antifire agents for Specialties Development Corp. (Belleville, N.J.). One formula (U.S. Pat. 2,745,806) consists of a salt composition (40-55% zinc chloride, 5-20% hydrated magnesium chloride) dissolved in water; the other (U.S. Pat. 2,745,-

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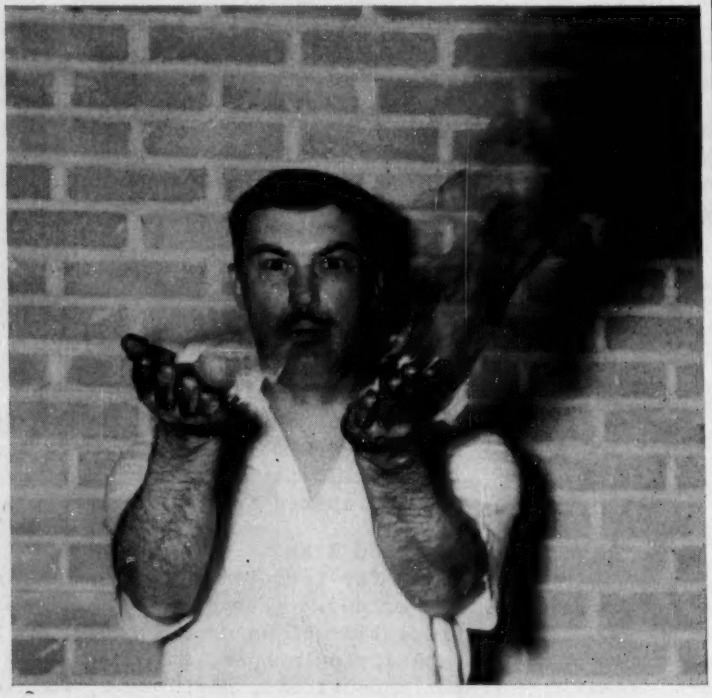
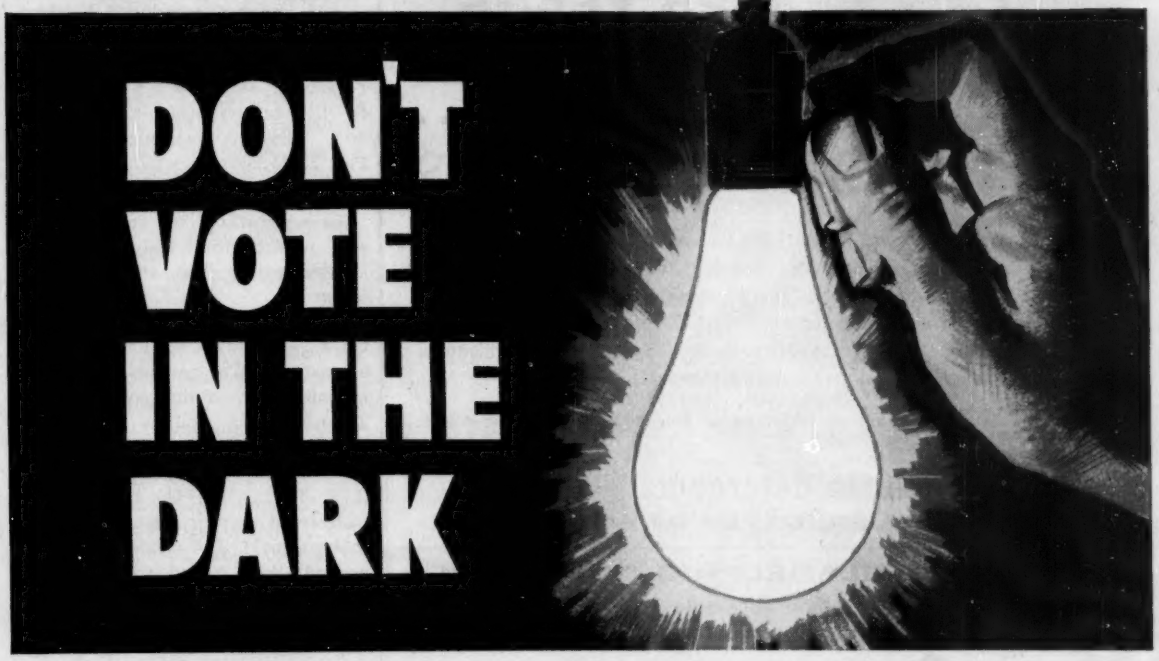


Perfumer's Fiery Side Line

REESE HART, Columbia, S.C., perfume maker, is building a side-line specialties industry as a supplier of spectacular theatrical effects. He's shown demonstrating his "cold" fire—a liquid solvent formulation that burns with a yellow flame (many such stage effects produce a blue flame) so cool that it won't ignite tissue paper or warm the hands. A semiprofessional magician himself, Hart advertises his special effects via theatrical papers. He devotes most of his time to devising perfumes based on flowers native to South Carolina.

VOTE + but



Study the issues and the candidates—and then decide where you stand

You wouldn't buy a new car without at least driving it around the block.

You wouldn't buy a new house without checking up on the neighborhood, the schools, and any back taxes.

So vote—but don't vote in the dark in this exciting election year.

Listen to what candidates are saying on TV and radio.

Read your newspapers—especially the political news and editorial page.

Talk things out with your neighbors over the back fence and at the filling station on the corner. Take part in the discussion group at your church, club, lodge, or school.

Think about the issues and the candidates—and then make up your own mind. Remember, nobody is in that voting booth but you and your conscience. Step behind that curtain with pride on election day. Then vote as a free American.

VOTER'S CHECKLIST

1. Be sure you're registered.

2. Study the issues and candidates. Go to rallies. Ask questions. Read the papers. Listen to speeches.

3. Mark up a sample ballot in advance. (They are published in the papers.)

4. Join your neighbors at the polls on Election Day November 6th.

Is your name in the book?

You can't vote if you're not registered. You lock yourself out of the polls, unless you're a registered voter. And you and only you can get your name in the Registration Book. When they call the roll on election day, will you be there? Do you know anyone who won't?

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Soap, our first product in 1831, was followed 25 years later by silicate of soda, used in our soaps. Silicates became PQ's exclusive interest in 1904, and research was intensified on new silicates and their uses.

PQ introduced and patented the first dry, free-flowing sodium metasilicate, a new industrial alkali. In succession came sodium sesquisilicate, anhydrous metasilicate and concentrated sodium orthosilicate.

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SPECIALTIES

807) is a water solution of 40-45% zinc chloride and 5-15% of a material such as calcium bromide, lithium iodide, or zinc bromide. This latter material is said to be serviceable at temperatures to —65 F.

• A nonaqueous solution has been developed by Lawrence Roe for Bjorksten Research Laboratories, Inc. (Madison, Wis.). It's a mixture of 60-70% carbon tetrachloride and 30-40% dibromodifluoromethane (U.S. Pat. 2,745,808).

•

Groundwork: New approaches to soil sterilizing and soil conditioning are turning up; here are two of the latest:

• Esso Research and Engineering Co. suggests use of sodium borate and aromatic cracked gas oils (or cutback asphalt oil) to sterilize soil (U.S. Pat. 2,741,550).

• Inventor Gordon Daline has devised a soil conditioning compound (U.S. Pat. 2,741,551) consisting of hydrolyzed polyacrylonitrile with dry soybean meal. The nitrile is first pulverized, then coated with a water-soluble organic adhesive. Next step is to add this treated nitrile to a relatively large amount of soy meal, while spraying the batch with water.

PRODUCTS

Shiny, Not Slippery: Westwax is a new water-emulsion floor wax being introduced by West Disinfectant Co. (Long Island City, N.Y.). The new material, based on carnauba wax, is formulated with a synthetic resin and Du Pont's Ludox (colloidal silica) antislip agent.

•

Combination Fluid: Monsanto has come up with a hydraulic fluid that serves also as a heat transfer medium. The product is 62% chlorinated biphenyl (54% chlorine), 25% *o*-terphenyl, 13% biphenyl.

•

Safety Bug-Killer: Slug-a-Bug is the new household insecticide sold by Bridgeport Brass Co. The new material, containing no DDT, is said to be safe for use near food. It's aerosol-packaged, has a pleasant odor when sprayed.

•

Conventional, but Different: Intended for printing on Mylar polyester film, but requiring only conven-

tional equipment and thinners, is a new series of inks developed by Claremont Pigment Dispersion Corp. (Roslyn Heights, N.Y.). Formulations adapted for flexographic printing, silk screening, stamping and striping are available.

•

Painless Germ-Killer: Latest nonstinging, stainless antiseptic for home use is Isodine Pharmacal Corp.'s (Dover, Del.) Isodine. The new product is a nonreactive form of iodine—iodine tied up with polyvinylpyrrolidone. It's plugged for its safety, painlessness, and nonstaining properties.

•

Police Action: How do you maintain the integrity of your organization if you do product testing for industry groups? National Institute of Rug Cleaning, Inc. (Bethesda) has the problem—it's currently trying to prevent Artloom Carpet Co. (Philadelphia) from using the NIRC approval seal in ads, and halt that company's "misrepresentation" of the results of NIRC's test program.

•

To Jel or Not: Sears, Roebuck's new jel paint will be introduced on the West Coast (*CW, June 23, p. 50*). Pacific Paint and Varnish Co.'s Berkeley, Calif., plant will produce the nondrip paint for test marketing.

• Sherwin-Williams, on the other hand, is holding off on its U.S. introduction of a jel paint. Kem-Jel, a coating of this sort, is currently being sold in Australia, but time for its sale here hasn't yet been set.

•

Preparation: To ready your car for Turtle waxing, Plastone Co. (Chicago) is now offering a free container (12-oz.) of Turtle Wax Car Wash with $2 bottle of the auto polish. A detergent, not intended for removing old wax, it is designed to sell for $1.

EXPANSION

Suburban Location: Fred'k A. Stresen-Reuter, Inc. (Chicago) has just opened a new laboratory, office, and warehouse facility in suburban Bensonville, Ill. The new structure contains 5,000 sq. ft. of lab area, as well as an equal amount of office space. Warehouse portion occupies 15,000 sq. ft. The firm makes paint driers and vehicles, and also printing ink specialties.

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(Continued from preceding page)

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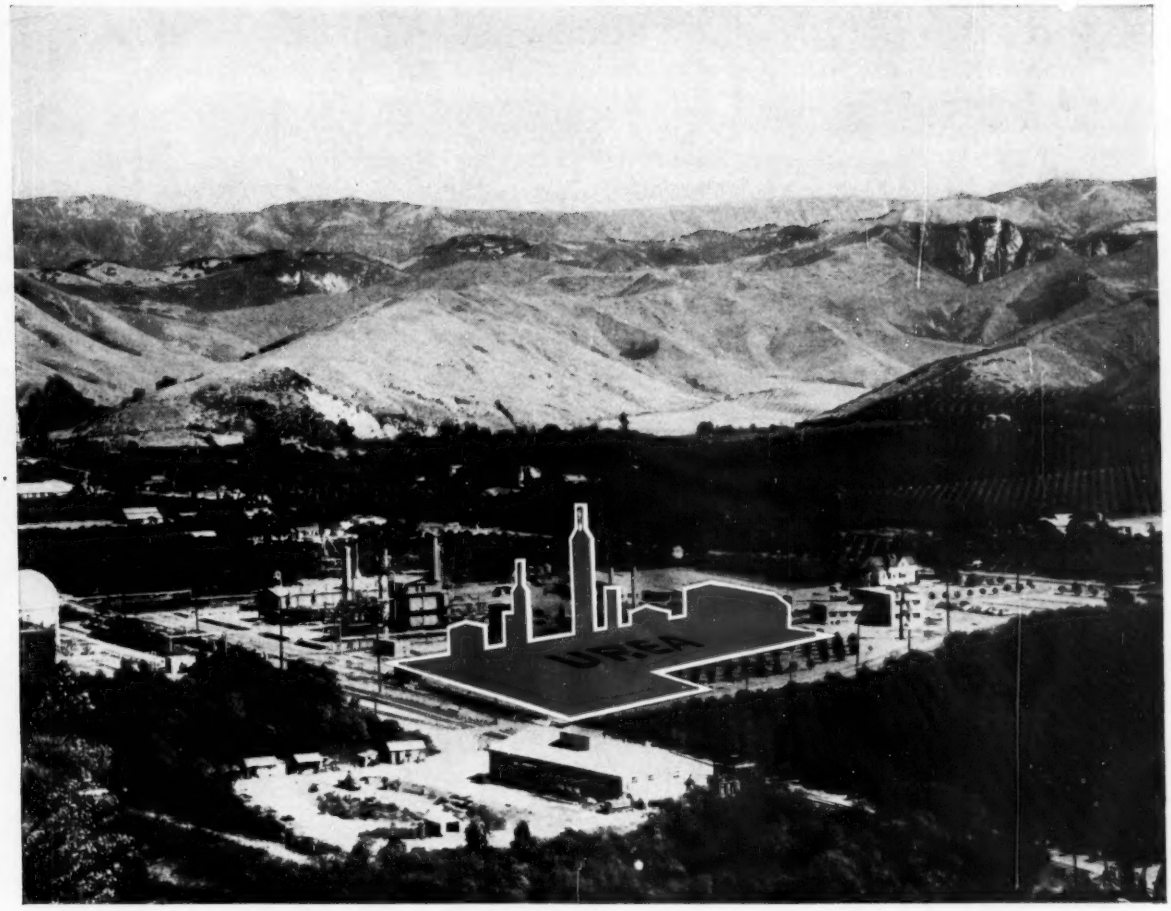

SHELL CHEMICAL IS ADDING SOMETHING NEW

Next door to its ammonia plant at Ventura, California—in the heart of a rich agricultural area, Shell Chemical Corporation has picked the logical location for its new urea plant. The M. W. Kellogg Company worked with Shell Chemical in engineering the project, and is now well ahead with construction. The plant will be completed this fall. M.W. Kellogg also engineered and built Shell Chemical's adjacent 150 ton/day ammonia plant, from which raw materials will be piped into the urea facilities.

Designed to produce 100 tons of high purity urea per day, the Ventura plant will be the chemical industry's first urea manufacturing facilities on the West Coast. It will also be the first urea plant in the entire U.S. to use the Montecatini process which, in addition to being considered the most efficient yet developed, overcomes the severe corrosion problems encountered with conventional urea processes.

If your company is considering new or expanded production of petrochemicals—especially of urea, ammonia, ethylene, phenol, or butadiene—M. W. Kellogg's long and broad experience with hydrocarbons in these areas is your assurance of low initial and operating costs, as well as high yields.

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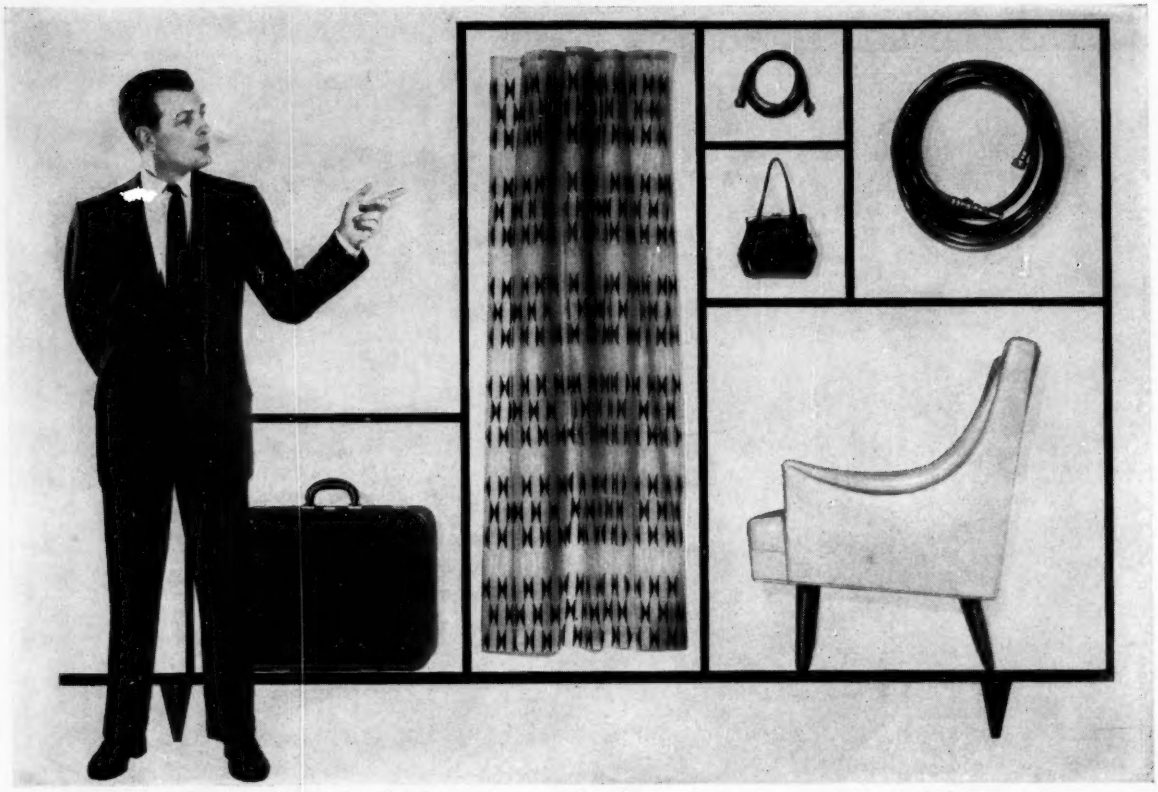

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